INFORMATION TECHNOLOGIES, INTERNET, AND E-COMMERCE MARKET OPPORTUNITIES FOR U.S. SMALL- AND MEDIUM-SIZED BUSINESSES

ExportIT Brazil: An Update

U.S. DEPARTMENT OF COMMERCE

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Information on the Office of Information Technologies can be found at http://ExportIT.ita.doc.gov

FOREWORD

This report updates a previous study entitled "ExportIT Latin America: Highlighting Argentina and Brazil" which was published by the U.S. Department of Commerce's International Trade Administration in June 2000. Like its predecessor, it describes and analyses the trends, key issues, and events in information technology (IT), the Internet, and electronic commerce (e-commerce) adoption during 2001, highlighting Brazil. The report creates a framework from which U.S. small- and medium-sized enterprises (SMEs) can make educated business decisions about entering this market. It analyzes the most recent economic, cultural, and political factors influencing the adoption of information technology, the Internet, and e-commerce. The report highlights information and market opportunities relevant to U.S. SMEs in the IT industries. The original study details suggested market entry strategies for smaller firms, U.S. Department of Commerce and other resources to assist these firms in their market entry endeavors, and contacts in the United States and Latin America.

The report is based on market research and analysis undertaken in Latin America in September 2001 by Tim Miles, Director, the Information Systems Division, in the Office of Information Technologies in the U.S. Department of Commerce International Trade Administration's Trade Development group. He interviewed computer hardware, software, Internet, and telecommunications equipment and services suppliers, trade associations, industry analysts, journalists, and government officials in Rio de Janeiro, Brasilia, and Sao Paulo. The work was actively supported by Genard Burity, Daniele Andrews, Ebe Raso, and Lynn Wong, the International Trade Administration's U.S. and Foreign Commercial Service (US&FCS) market specialists in this country. Information gathered from on-site interviews is supplemented with data from market research firms, government agencies, the U.S. and Foreign Commercial Service, and an extensive review of available literature on the Internet and in business and trade journals.

TERMS & ABBREVIATIONS

$	Unless otherwise noted, dollar figures cited in the report are U.S. dollars
2G	second generation
3G	third generation
ABES	Brazilian Software Companies Association
ABPI	Brazilian Association of Intellectual Property
ABRANET	Brazilian Association of Internet Service Providers
ADSL	asynchronous digital subscriber line
AMPS	advanced mobile phone service
ANATEL	National Telecommunications Agency
ARPL	average revenue per line
ARPS	average revenue per subscriber
ARPU	average revenue per unit
ASPs	application service providers
ASSESPRO	Brazilian Association of Software and Computer Services Organizations
B2B	business-to-business
B2C	business-to-consumer
BCG	Boston Consulting Group
BNDES	National Economic and Social Development Bank
BSA	Business Software Alliance
BTA	Agreement on Basic Telecommunications Services
C2C	consumer-to-consumer
CAGR	compound average growth rate
CAP	competitive access providers
CDPD	cellular digital packet data
CDMA	code division multiple access
CLEC	competitive local exchange carrier
CM	contract manufacturer
CNC	National Confederation of Commerce
CNPJ	Brazilian Federal Taxpayers' Registry
COD	cash on delivery
CPP	calling party pays
CRITO	Center for Research on Information Technology and Organizations
CRM	customer relationship management

DECT digital enhanced cordless telecommunications
DLD domestic long distance

TERMS & ABBREVIATIONS—continued

ECT Brazilian Post Office Agency
EDI electronic data interchange
EDM electronic document management
ERP enterprise resource planning

FAPESP Foundation for Research of the State of Sao Paulo
FCC Federal Communications Commission
FDI foreign direct investment
FIRJAN Federation of Industries for the State of Rio de Janeiro
FMC fixed/mobile convergence
FTAA Free Trade Agreement of the Americas
FGV Fundacao Gertulio Vargas
FUST Fund for the Utilization of Telecommunications Services
FWA fixed wireless access

GATS General Agreement on Trade in Services
Ghz billion cycles per second
GPRS general packet radio service
GPS global positioning system
GSM global system for mobile communications
GSP General Schedule of Preference

HDSL high bit rate digital subscriber line

ILD international long distance
ICT information and communications technologies
ICMS Merchandise Circulation Tax
ICP-Brazil Brazilian Public Key Infrastructure
IDC International Data Corporation
IDC internet data center
IDEN Integrated Digital Enhanced Network
IFACs Industry Functional Committees on Trade Policy Matters
IMF International Monetary Fund

INPI	Brazilian Patent and Trademarks Agency
IPI	Industrial Products Tax
IPA	Intellectual Property Alliance
IPR	intellectual property rights

TERMS & ABBREVIATIONS—continued

ISA	industry sector analysis
ISDN	integrated services, digital network
ISACs	Industry Sector Advisory Committees
ISP	Internet service providers
IT	information technology
ITA	Information Technology Agreement
ITA	International Trade Administration
ITU	International Telecommunications Union
LMDS	local multipoint distribution system
MEP	minimum estimated prices
MFN	Most Favored Nation
MMDS	multipoint multichannel distribution system
MSO	multi-service operator
MOU	minutes of use
NTDB	National Trade Data Bank
OECD	Organization for Economic Cooperation and Development
OETCA	Office of Export Trading Company Affairs
PDA	personal digital assistant
PPP	public-private partnership
PC	personal computer
RECOF	Federal Revenue Secretariat's Special Industrial Warehouse Regime under Computerized Control
SEBRAE	Brazilian Small Business Agency
SCM	supply chain management
SMR	special mobile radio

SME	small and medium-sized enterprise
SMS	short message service
SOFTEX	Brazilian Program for Software Export
SPB	Brazilian System of Payments
TAP	public access terminal
TDMA	time division multiple access

TERMS & ABBREVIATIONS—continued

UMTS	universal mobile telecommunications system
USEAC	U.S. Export Assistance Centers
USTR	Office of the U.S. Trade Representative
VAS	value added services
VAT	value-added tax
VOIP	voice over Internet protocol
VSAT	very small aperture terminal
WAP	wireless application protocol
WLL	wireless local loop
WTO	World Trade Organization
Y2K	Year 2000

EXECUTIVE SUMMARY

Brazil is the leading information technology (IT) market in Latin America, accounting for one out of every two dollars spent on IT products and services in this region. After a rather dismal 2001, Brazilian IT demand should improve this year as Brazil's gross domestic product is expected to return to a more vibrant 2 to 2.5 percent growth rate. Much of this optimism for the Brazilian economy has arisen from this country's emergence from a ten month-long energy crisis and a lowering of the key interest rate in early 2002. International Data Corporation (IDC), a U.S. market research company, predicts that IT spending there should increase 3 percent to nearly $13 billion by the end of 2002. Computer hardware demand should decline slightly while networking equipment should recover. IT services is expected to have the most pronounced turnaround of any IT spending category though. Packaged software purchases should be even higher than they were in 2001.

Brazil has long been the second largest market in Latin America after Mexico for U.S. computer exporters. Benefitting from the Brazilian government's relaxation of its market reserve policy, U.S. computer equipment exports rose steadily for most of the past decade. They have fluctuated in recent years though due to the adverse effects of a regional recession and devaluations of the Brazilian real had on demand for U.S. computer hardware there. These exports have also been restrained by other factors such as competition from cheaper, illegally imported PCs and the Brazilian government's efforts to nurture its domestic computer industry through fiscal incentives, preferential public sector procurement, and extraordinarily high tariffs. However, their growth will likely resume in the near future as the Brazilian economy improves and tariffs are lowered. The Brazilian government may even eliminate all duties on imported computers if it elects to join the Free Trade Agreement of the Americas (FTAA) or becomes a signatory to the Information Technology Agreement (ITA).

U.S. firms have a strong presence in the Brazilian software market through their local operations and imports and have continued to dominate nearly all Internet (e.g., browsers)

and electronic commerce-related software and services, operating systems for both server and PC platforms, data base management systems software, and applications development tools. However, they must contend with Brazil's high rate of software piracy, the current uncertainty over tariff treatment, and a variety of federal, state, and local taxes levied on their products and services.

The long-term outlook for IT sales in Brazil is extremely good since the Brazilian economy is expected to have a growth spurt of more than 3.5 percent annually over the next few years. The only factors that might adversely affect this outlook would be another downturn in the global economy, a return of the energy crisis that Brazil endured in 2001, and further substantial devaluation of the real. Brazil's computer hardware market should be buoyed up by the private sector's ongoing modernization of its operations and the Brazilian government's commitment to providing Brazilians with electronic government (e-government) and expanding computer and Internet use throughout this country. These efforts should translate into significant sales opportunities for U.S. suppliers of servers, desktop and notebook PCs, handheld computers, and even used PC systems in the future. The rising tide of systems purchases should also benefit U.S. peripheral equipment firms. Best prospects include scanners, printers, disk drives, and digital video disk (DVD) players. Demand for high-end data storage devices should be particularly strong as well, given increased concern in Brazil about data security and disaster recovery following the September 11th terrorist attacks in the United States.

The Brazilian packaged software market has enormous potential for U.S. companies as long as Brazil makes meaningful progress in combating intellectual property rights violations. Brazilian manufacturing and services corporations have a significant need for software solutions that will help them to reduce costs and increase profits through automation of their industrial and commercial processes. The software packages that will continue to be in the highest demand among businesses in Brazil are those for customer relationship management (CRM), supply chain management (SCM), networking and communications, database management, electronic document management (EDM), and enterprise resources planning (ERP). Corporate security concerns should result in heavy spending on IT security solutions such as encryption, anti-virus, and firewalls. The end-user sectors that U.S. firms might consider targeting first are financial services institutions and retail operations since they face the most immediate security threats. Brazilians have also shown a keen interest in solutions developed around the Linux operating system and Java applications development tools.

Desktop PC applications, such as word processing, spreadsheet, and graphics are also good opportunities as the use of PCs grows among small and medium-sized enterprises (SMEs) and more affluent home users. Educational software packages will emerge as another lucrative area in concert with the Brazilian government's effort to provide PCs to secondary schools and its focus on electronic learning.

Brazil should be an excellent market for networking equipment, benefitting from the ongoing build-out of the telecommunications infrastructure and corporate interest in establishing intranets and extranets. Greater PC and Internet use in education and healthcare should also lead to the spread of networking on university campuses, in schools, and among hospitals, clinics, and other medical facilities. Cahners In-Stat Group, another U.S. market research firm, believes that Brazil holds immense promise for wireless local area networks.

Spending on IT services in Brazil is projected to overtake investment in computer equipment by 2003 and increase very rapidly thereafter, according to IDC. A growing number of cost-conscious Brazilian businesses have been outsourcing their systems and network management and data processing activities to IT services suppliers over the past several years and should continue to do so. Public sector agencies and corporations engaged in a large number of modernization programs have a great need for IT consultants and systems integrators to install, program, and connect servers to legacy systems, to integrate front and back offices, and to provide education and training to alleviate Brazil's acute shortage of qualified IT personnel. Finally, corporate executives have always considered data warehousing and IT security services an important part of their IT budgets, but should boost these investments substantially in the wake of the September 11th terrorist attacks on the United States.

Brazil has the most PCs installed and the largest Internet population in Latin America. However, use of PCs and the internet is still confined to the wealthy due to various infrastructural and socioeconomic barriers. These barriers include limited access to electricity and wired telecommunications, high Internet access and use costs, low educational attainment among the majority of the Brazilian population, and inequitable income distribution. The Brazilian public and the private sectors have launched efforts to deal with these problems over the past few years. The Brazilian government has projects underway to provide schools and communities across Brazil with PCs and Internet access, to modernize the national healthcare system and give all Brazilians medical care service through the use of IT, and to improve government services and ensure that every citizen has access to them through electronic government. It has also been working diligently to bring down the costs of PC ownership and Internet access. State governments and private sector entities have similar educational and community Internet initiatives. The National Confederation of Commerce (CNC) is optimistic that the prospects for wider PC and Internet use are improving in Brazil. The Yankee Group, a U.S. market research house, expects that the number of Brazilian Internet users will triple to 42 million by 2006.

Brazil experienced the same dotcom shakeout that occurred in the United States and in many other developed nations from late 2000 onwards. The number of ISPs was cut in half to less than 700 by mid-2001. Several of the businesses that provided free Internet access closed their doors or were forced to diversify

into more lucrative areas, such as content and network services, when revenues from advertising were insufficient to sustain operations and venture capital dried up. The ISP market is now controlled by a handful of players, and further consolidation of Brazil's ISPs is expected in 2002.

Improvement in the fortunes of ISPs is likely in the near future though as Brazil's economy picks up and Internet use spreads among the middle class, small businesses, and schools. As a result, there are numerous potential opportunities for U.S. suppliers in Brazilian Internet services. The expansion of electronic commerce (e-commerce) and e-government will undoubtedly create significant demand for the services of companies that can design and develop web sites, provide content for them, and host them. Involvement in e-commerce may also stimulate many firms to outsource all of their web site and interconnection needs rather than taking on the burden of costly investments in telecommunications, network, and computing infrastructures as well as the in-house personnel required to run these operations.

Although broadband is still in its infancy in Brazil, Brazilian users, especially SMEs and high income residential customers, will increasingly demand Internet connection through this high speed service. Businesses in remote areas where wired telecommunications are not yet available may opt for satellite service. Wireless Internet access for home and business through wireless applications protocol (WAP) and other kinds of services should grow substantially. Its use by companies will increase with the spread of mobile commerce in Brazil. Wireless may also be much more viable than wired access for home users, considering the low PC penetration and the popularity of cellular telephony there.

Brazil has the most networked economy in the region, according to a joint Harvard University Center for International Development and World Economic Forum study published in March 2002. Recent estimates of the size of the Brazilian e-commerce market in 2001 range widely from $2.1 billion (Fundacao Gertulio Vargas, a major Brazilian economic and business research institute) to $5.3 billion (IDC). One of the factors driving its growth in this country is strong government support for greater use of IT and the Internet to bridge the Digital Divide and to boost Brazil's economy. Another is a mounting interest within Brazilian industry in using electronic business to reduce costs and increase operational efficiency and, thus, competitiveness. IDC expects that e-commerce in Brazil may quadruple to over $20 billion by 2004, with business-to-business (B2B) still accounting for most of this activity.

B2B drives e-commerce in Brazil. Brazilian businesses involved in it had great expectations in 2001 and set a goal to more than double their Internet-related revenues and investments from 2.4 percent of sales in 2000 to 5.6 percent by the end of 2001. Various e-commerce initiatives have emerged there over the past two years focused on: electronic procurement of basic supplies (e.g., telecommunications and petrochemicals); electronic marketplaces operated by automotive, chemical, agricultural, and

construction companies to trade goods and services within their respective industries; and vertical portals for transactions among industries participating in one supply chain, such as Transora, a multinational consumer goods consortium. However, finance and retailing continue to lead B2B e-commerce. Most companies are at an early stage of e-commerce development since more than half use the Internet only for email and information gathering purposes. By contrast, large and very large Brazilian corporations (more than 500 employees) are very advanced e-commerce users at the transactional stage of development. They use the Internet to increase their productivity, develop new marketing channels, and induce their business partners to adopt their standards and operational practices.

Despite the growing awareness of the advantages of B2B e-commerce, many Brazilian firms must overcome a number of difficulties before they can move beyond rudimentary uses of the Internet. The issues that they are most concerned about are privacy and the security of online transmissions of confidential information. They also have a great need for qualified people to implement and operate the IT infrastructure that supports e-business. And, finally, some Brazilian and foreign companies complain about the inadequacies of the telecommunications infrastructure in Brazil, especially the limited access to high speed digital lines and the low quality of transmission. Both the Brazilian private and public sectors understand that they must continue to work together to address these concerns through the development of appropriate e-commerce policies, the expansion of IT training, and telecommunications deregulation and investment.

Brazil leads Latin America in online retailing, accounting for more than half of Internet sales in this region. It benefits from the most advanced e-commerce industries and the largest Internet population in the region, a wide range of Portuguese-language content providers, and a sophisticated home banking system with state-of-the art equipment. More than 3 million Brazilians purchased online in 2001, but the number of active buyers represented less than 20 percent of all Internet users in Brazil. More widespread use of B2C is limited by socioeconomic, cultural, and infra structural barriers. These include a lack of disposable income among the majority of Brazilians, consumer concern about online security, a preference for shopping at local stores and malls, and an inadequate transportation infrastructure that restricts delivery of products bought over the Internet.

The majority of Brazilian firms need to move beyond their limited use of the Internet for email and information gathering to building web sites to present their products and services and to undertake transactions online. The more profitable of them are likely to establish intranets and extranets, to engage in electronic procurement, and to integrate their logistics with suppliers as their businesses grow. Their involvement in these activities should significantly boost demand for web design, development, and hosting services, ERP, and SCM. When B2C finally takes off in other sectors outside of retail and automotive,

Brazilian businesses will invest more heavily in CRM applications such as online order management, sales and marketing, and customer service and support. U.S. vendors should do well in the Brazilian market for e-commerce applications, given their strength in these areas.

Brazil does not currently have any specific legislation that regulates e-commerce. However, the Brazilian Civil Code and other general legislation is applicable to transactions that take place on the Internet. In some e-commerce transactions where disputes have arisen, the resulting court cases have exposed some shortcomings in Brazil's existing legal regime with regard to these transactions. Bills which address the particular legal issues raised by e-commerce and stipulate regulations supporting its development in this country have been under consideration in the Brazilian Congress for some time. Most of the legislative action has been directed toward digital security.

INFORMATION TECHNOLOGY

The Brazilian economy and IT spending take a hit in 2001

Brazil is the leading information technology(IT) market in Latin America, accounting for one of every two dollars spent on IT products and services in this region. Brazilian IT spending underwent explosive growth for much of the 1990s, as Brazil liberalized trade, privatized telecommunications, and moved to control inflation and stabilize its economy. Although this growth was interrupted in 1999 by a regional recession, the IT market recovered strongly in the following year and appeared to be on track for another banner year in 2001. Unfortunately, according to the latest International Data Corporation (IDC) estimate, IT demand fell 10 percent to $12.6 billion last year when the direction of Brazil's economy changed abruptly once again. The economic slowdown which adversely affected IT spending was due to a number of factors. Brazil was battered externally in 2001 by the dampening effect of Argentina's debt crisis on investment. The Brazilian government's actions to keep its economy afloat played a significant role as well. Its sharp devaluation of the Real versus the U.S. dollar during the year fueled inflation and spurred the Central Bank to raise its key interest rate to as high as 19 percent, causing Brazilian consumers to stick mainly to basic purchases and businesses to hold back on spending. Faced with an energy crisis, the Brazilian government was also forced to mandate rationing in June 2001. This emergency led the private sector to cut back production and to invest in energy-saving equipment which left less money in budgets for IT products and services. The only end-user sectors that reportedly had some growth in IT spending last year were the government and the energy, construction, transportation (railroads), and banking industries. Most companies were very cautious and conservative in making IT purchases.[1]

Prognosis better this year

Brazilian IT demand should improve this year, given expectations that gross domestic product (GDP) there will increase 2 to 2.5 percent versus only 1.5 percent in 2001. Much of this optimism for the Brazilian economy has arisen from the country's emergence from the ten month-long energy crisis and a lowering of the key interest rate in February. However, some observers feel that inflation could continue to constrain

[1] Interviews with Kleber Barroso, Sales Account Manager for Telco Computer Systems, Sun Microsystems, and Marcelo Amaral, IT Specialist, Federation of Industries for the State of Rio de Janeiro (FIRJAN), September 20, 2001; "Global IT Economic Outlook, 4Q01", Kevin White et al., International Data Corporation, December 2001; and "Brazil's December Industrial Output Falls 6.1%", Catia Cortes, Bloomberg Latin America, Bloomberg.com, February 6, 2002.

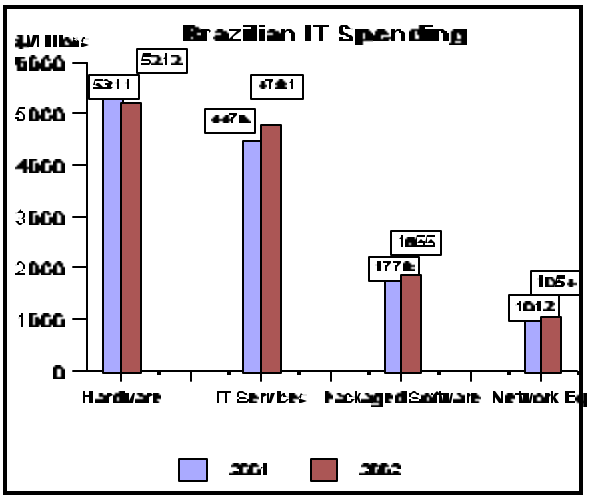

FIGURE 1. Source: IDC, 7/02

purchasing power.[2] IDC has cut back a forecast made in December 2001, but is still predicting 3 percent growth in IT spending to nearly $13 billion by year-end.[3] (FIGURE 1)

Computer hardware demand off sharply last year

Accounting for almost half of Brazil's IT spending, computer hardware experienced the sharpest drop in sales of all IT segments during 2001. IDC estimates that purchases were down roughly 13 percent to $5.3 billion. Sales of peripheral equipment, such as disk and tape storage devices and printers, were exceptionally weak when compared to those for computer systems. Personal computers (PCs), which represented three quarters of the systems sold in Brazil last year, fared well in unit growth. Both desktop and notebook unit sales rose 11.6 percent and 18.5 percent, respectively. However, the overall PC market fell 5 percent in value due to the real devaluation and price competition among suppliers. This decline also reflected some slowing of new purchases and upgrades by the private sector which reportedly held back its migration to Windows 2000 to evaluate the new Windows XP operating system, according to a Gartner Dataquest analysis. PC sales could have been a lot worse had it not been for a large number of government tenders issued for these systems during the third quarter. The Brazilian server market segment was soft as well because small and medium-sized enterprises (SMEs), a growing customer base for these systems, were hurt the most of all business users by the sluggish economy and the energy crisis. However, sales to larger companies were higher, particularly to the financial community which made massive buys of these systems in preparation for the opening of the electronic clearance house by the Central Bank in April 2002.[4]

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[2] "Capital Markets: Moody's Changes Outlook on Brazil", Arkady Ostrovsky, Financial Times, February 28, 2002; "Editorial Comment: Brazilian Bulls", Financial Times, March 14, 2002; and "Brazil's Ilan Goldfajn Comments on Economic Growth for 2002", Romina Nicaretta, Bloomberg Latin America, Bloomberg.com, March 27, 2002.

[3] IDC polled 50 leaders of large Brazilian corporations across various economic sectors on their IT spending plans for 2002. The survey found that 38 percent intended to increase their IT budgets, 33 percent would keep them at the same level as 2001; 12 percent would reduce their investments, and 17 percent were undecided. Source: "IT Market", International Market Insight, U.S. Department of Commerce, April 2, 2002.

[4] Interview with Luiz Claudio de Pinho Almeida, Economist, National Confederation of Commerce (CNC), September 21, 2001; "Brazilian Hardware

No hardware recovery expected in 2002

IDC expects that computer hardware demand will decline 2 percent to $5.2 billion this year. Although purchases of servers and workstations will continue to be in the doldrums, Brazilian PC spending should increase both in value and units based on stronger anticipated growth in the Brazilian economy and pent up demand for these systems among businesses and more affluent home users. Notebook unit shipments are expected to increase 30 percent as their use continues to spread more broadly from executives of large corporations to all types of professionals, university students, and sales and service personnel. Data storage device sales should also grow, rising 11 percent to $477 million. Demand for these peripherals should be driven by the large volumes of data that have been generated by the growth in electronic business (e-business) in this country and heightened concern about data security and disaster recovery following the September 11th terrorist attacks in the United States.[5]

U.S. computer suppliers serve Brazilian market mainly through local production

U.S. computer suppliers currently have only a 17 percent share of the Brazilian market through imports and have served their Brazilian customers largely from the plants located there. IBM and Unisys had a manufacturing presence in Brazil even during the period of Brazil's market reserve policy and were followed by Compaq, Hewlett Packard, and Dell after liberalization began in 1990. Solectron and SCI have established contract production operations there as well to service many foreign and domestic clients. These companies have concentrated on meeting domestic demand, but also play an important role in Brazilian computer exports to other Mercosur countries since they can ship their products to Argentina, Paraguay, and Uruguay duty free. Most of their Brazilian-owned competitors over the past decade went out of business, moved into other areas such as IT services and distribution, or were acquired by foreign firms entering the Brazilian market. The survivors were either the subsidiaries of larger industrial and financial conglomerates or the more successful Brazilian manufacturers who entered joint ventures with foreign partners to gain access to the latest technologies. U.S. suppliers have strong positions in servers and PCs (especially notebooks), but continue to be challenged by major local companies such as Itautec, Microtec, UIS, and Tropcom. They also have had to contend with a substantial "grey" market, consisting of illegally imported products and products assembled by small firms from smuggled components.[6]

Industry, 3Q01 (Executive Summary)", Luis Anavitarte et al., Gartner Dataquest, December 4, 2001; and "Brazil: Personal Computer Sales Grew 8.3 Percent in 2001", Sao Paulo Folha Online, February 22, 2002.

[5] "IT Market" and "Notebook Sales", International Market Insight reports, U.S. Department of Commerce, April 2, 2002.

[6] "Brazil Meets the Global Challenge: IT Policy in a Post-Liberalization Environment", Paulo Bastos Tigre and Antonio Jose Junqueira Botelho, Center for Research on Information Technology and

Illegal imports problematic for legitimate computer producers

The presence of illegally imported systems in Brazil has long been a major problem for legitimate computer manufacturers, particularly the leading U.S. suppliers, and has made estimating the true size of the Brazilian computer market a difficult task. Smuggled into Brazil largely from Paraguay, these systems reportedly total $3 billion and may account for as much as 70 percent of all the desktop PCs sold in that country.

Illegally imported computers have thrived in Brazil because of the lack of effective and efficient customs enforcement and the high taxes traditionally levied on hardware products by state and federal governments. They have had even a greater adverse effect competitively on computer imports from the United States that are subject to substantial duties and have also been battered by the devaluation of the real. However, some observers feel that illegal imports may play less of a role in the future when cheaper domestically-produced systems sold through low-cost distribution channels, such as supermarkets, become more available for lower-income families.[7] Recent information from IDC indicates that the share these systems have of the Brazilian notebook PC market has declined from 65 percent in 1994 to 48 percent today.[8]

Computer equipment exports from the United States decline once again in 2001

Brazil has long been the second largest market in Latin America after Mexico for U.S. computer exporters. Benefitting from the Brazilian government's relaxation of its market reserve policy U.S. computer equipment exports to this country rose steadily during most

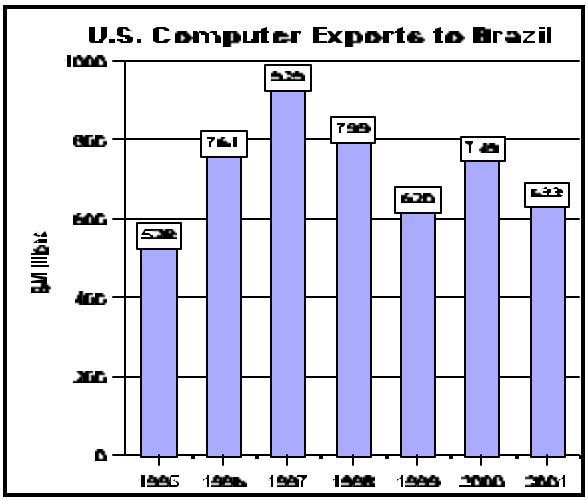

FIGURE 2. Source: U.S. Department of Commerce

of the past decade, but peaked in 1997 at nearly $929 million. Thereafter, U.S. shipments declined due to the adverse effects that a regional recession and a 40 percent

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Organizations (CRITO), University of California, Irvine, November 1999; and "Leading Sectors for U.S. Exports and Investments", Country Commercial Guide for Brazil in 2002, U.S. Department of Commerce.

[7] Interview with Genard Burity, Commercial Specialist, U.S. Commercial Service, Rio de Janeiro, September 20, 2001; and "Brazil Meets the Global Challenge: IT Policy in a Post-Liberalization Environment", Paulo Bastos Tigre and Antonio Jose Junqueira Botelho, Center for Research on Information Technology and Organizations (CRITO), University of California, Irvine, November 1999.

[8] "Notebook Sales", International Market Insight, U.S. Department of Commerce, April 2, 2002.

devaluation of the Brazilian real had on demand for U.S. computer hardware there. They recovered strongly in 2000 though as Brazil emerged from its recession. U.S. computer equipment exports then dipped once again last year to only $644 million, hit by a slowing Brazilian economy and another currency devaluation which made U.S. computer systems and peripherals even more expensive than locally produced and illegally imported products. (FIGURE 2)

Brazilian government policies continue to stand in the way of U.S. computer exporters

Other factors have acted to restrain U.S. computer equipment shipments to Brazil as well. The Brazilian government still nurtures the growth of its domestic computer production base through fiscal incentives, procurement, and tariffs. Its "Basic Productive Process" (PPB) program introduced in 1994 has provided fiscal incentives that have allowed Brazilian computer firms to produce their computer equipment more competitively than products sourced outside of Brazil as long as they invest 5 percent of their total revenues in research and development. As a result, Brazilian PCs are sold at prices up to 35 percent less than legally imported systems.[9] Brazilian federal, state, and municipal governments, as well as related agencies and companies, also pursue a "buy national" policy which gives preferential treatment in government procurement of computer equipment to both Brazilian-owned manufacturers and foreign companies with local production facilities.[10]

Extremely high Brazilian computer tariffs have protected local industry and required major U.S. computer hardware suppliers to establish plants in Brazil to serve this market rather than through imports from the United States. Duties on PCs, monitors, and printers are currently 30 percent of total import value while other hardware and peripheral imports are subject to an average tariff of 18 percent.[11] However, in an effort to spur IT exports, the Brazilian government does allow the computer and telecommunications sectors to import duty-free those inputs and components used to make products which will be eventually be exported under the Federal Revenue Secretariat's Special Industrial Warehouse Regime under Computerized Control (RECOF). Companies operating under this regime agree to export at least $8 million worth of goods out of Brazil in the first year and $16 million in the second.[12]

Taxes burden computer suppliers and keep prices high, restraining small business and home computer market growth

[9] "Leading Sectors for U.S. Exports and Investments", Country Commercial Guide for Brazil in 2002, U.S. Department of Commerce.

[10] 2002 Special 301 Submission: Brazil, Intellectual Property Alliance, February 2002.

[11] "Leading Sectors for U.S. Exports and Investments", Country Commercial Guide for Brazil in 2002, U.S. Department of Commerce.

[12] Virtual Imports on the Rise", International Market Insight, U.S. Department of Commerce, May 30, 2001.

State and federal taxes on computer equipment in Brazil have been a burden on both U.S. exporters and local hardware suppliers and have kept systems prices fairly high, retarding the growth of the small business and home markets in the process. States levy the Merchandise Circulation Tax (ICMS) which is a value-added tax on imports and domestic products that varies by jurisdiction, but which can be as high as 18 percent. The Brazilian government then places an additional 15 percent Industrial Products Tax (IPI) at the point of sale by the manufacturer in the case of domestically-produced goods, or at the point of customs clearance in the case of imports. However, it has traditionally provided a 100 percent rebate on the IPI to Brazilian computer firms as an incentive to encourage local manufacture. In January 2001, Brazilian President Cardoso extended this benefit beyond its scheduled expiration, but ordered that it be progressively reduced until 2009 when it will be finally abolished.[13]

U.S. computer export growth is likely to resume in the near future

Growth in U.S. computer exports to Brazil will likely resume in the near future as the Brazilian economy improves and tariffs are lowered. The President of the Brazilian Chamber of Foreign Commerce issued Resolution Number 7 recently which dropped the duty rate on information technology and telecommunications products to 4 percent for a two year period. The Brazilian government may even remove them altogether if it elects to participate in the Free Trade Agreement of the Americas (FTAA), which is scheduled to conclude in 2005, or becomes a signatory to the Information Technology Agreement (ITA).[14] The ITA is a plurilateral trade agreement that requires signatory nations to eliminate their tariffs on specific IT products, such as computer hardware, packaged software, and telecommunications equipment.

Networking equipment spending down last year; expected to recover in 2002

Networking equipment was another of the weak spots in IT spending last year, according to IDC. Purchases were off 1 percent to $1 billion Demand growth in this IT market segment this year should recover, rising 4 percent to $1.1 billion, as companies and public sector agencies continued to see the advantages of networking in carrying out their cost-cutting efforts and boosting their operational efficiency..

IT services down in 2001, but will recover strongly this year

Spending on IT services fell about as steeply as computer hardware in 2001. IDC estimates show that purchases were off 12 percent to $4.5 billion due to sharp declines in demand for

[13] "Americas: Tariffs and Other Taxes on Computer Hardware and Software", exportIT.ita.doc.gov, Office of Information Technologies, U.S. Department of Commerce, February 2001 and "Software Market", Industry Sector Analysis , U.S. Department of Commerce, May 29, 2001.

[14] "Modification of Import Tax Rate on IT and Telecom Products", Juliana Viegas et al., Baker & McKenzie E-Law Alert, May 6, 2002.

IT training and education and support services. This segment is expected to have the most pronounced turnaround of any IT spending category in 2002, with revenues up 7 percent to $4.8 billion. Significant growth should occur in private sector spending on IT consulting and implementation services, such as systems integration, as large companies resurrect major projects placed on hold last year. Suppliers engaged in providing operations management should find demand for their services greater as well.

Packaged software continues to thrive

Spending on packaged software remained relatively immune to Brazil's sluggish economy, rising 2 percent to $1.8 billion in 2001, according to IDC. A survey conducted by Gazeta Mercantil and reported in its March 22nd issue last year indicated that 147 Brazilian corporations (more than 500 employees), split almost equally between the manufacturing and service sectors, were looking for software solutions that would help them to decrease costs and increase profits through automation of their industrial and commercial processes. At the top of their lists of planned investments were software packages for customer relationship management (CRM), supply chain management (SCM), networking, security, and enterprise resource planning (ERP). Packaged software sales are expected to be even higher in 2002 than they were last year, given this robust private sector demand. IDC expects that Brazilian companies will spend heavily on IT security solutions, such as encryption, anti-virus, and fire walls, due to the shock they received from the September 11th terrorist attacks in the United States.[15]

Softex targets establishment of strong domestic industry

The Brazilian Program for Software Export (Softex) was introduced by the Brazilian government in 1993 to stimulate the development of a domestic software industry and software exports through the formation of technology centers in each state. Its specific goals were to have local suppliers control half of Brazilian software demand, capture 1 percent of the world software market (equivalent to $2 billion in exports), and to create 50,000 new skilled jobs through the year 2000. The Brazilian government invested close to $100 million from 1993 to 1996 in the program. From 1997 onwards, a non-profit organization, the Brazilian Society for Promoting Software Export was given the responsibility for managing it. Government funding was to cease in 2001.[16]

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[15] "Software Market", Industry Sector Analysis, U.S. Department of Commerce, May 29, 2001 and "IT Market", International Market Insight, U.S. Department of Commerce, April 2, 2002.

[16] "Brazil Meets the Global Challenge: IT Policy in a Post-Liberalization Environment", Paulo Bastos Tigre and Antonio Jose Junqueira Botelho, Center for Research on Information Technology and Organizations (CRITO), University of California, Irvine, November 1999 and "Innovative Program to Develop and Export Brazil's Software", Waldir Arevolo de Azevedo Filho, Gartner Research Note, March 15, 2002.

Many of the goals have been achieved, but Brazil not a major global software player yet

The Brazilian software industry has met many of the objectives of Softex. It has roughly 4,000 firms with 116,800 employees engaged in software development and had about $3 billion in revenues in 2000, according to statistics from the Software Economic Studies Institute and the Brazilian Software Companies Association (ABES). In terms of market presence, local production supplied 50 percent of Brazilian software demand. Small firms have dominated the industry, but have generally targeted niche markets, distributed foreign software programs, or developed custom applications for popular foreign programs to compete successfully in a highly fragmented market. Brazilian software suppliers have concentrated on developing custom software rather than packages and have done well in providing solutions for banking automation and security. They have also become more competitive with their U.S. counterparts in ERP, in which they now have a 25 percent market share, and CRM software. Brazilian firms benefit from the fact that the cost of software development is reportedly 50 percent less in Brazil than in the United States.[17]

Softex has likewise succeeded in encouraging cooperative partnerships between Brazilian software and service companies and their foreign counterparts in research and development, marketing, and sales. Brazil now has 21 groups of incubators involving academia and the private sector, including IBM and Microsoft. What Softex has not accomplished yet is to make the Brazilian industry a major player in the global market. Brazilian software exports have risen from $27 million in 1997, but were still only $100 million in 2001. Softex's goal is to export more than twice that value this year.[18]

U.S. presence in the Brazilian software market still strong

Despite the progress achieved by the domestic industry, foreign suppliers still have a strong presence in the $4 billion Brazilian software market (including customization and outsourcing).[19] Through their local operations and imports, U.S. firms have an estimated 55 percent share of domestic demand and

[17] "Software Market", Industry Sector Analysis , U.S. Department of Commerce, May 29, 2001; "IT Market", International Market Insight, U.S. Department of Commerce, April 2, 2002; and interview with Wanda Scartezini, National Secretary, Secretary of Information Policy, Ministry of Science and Technology, September 24, 2001.

[18] Interview with Wanda Scartezini, National Secretary, Secretary of Information Policy, Ministry of Science and Technology, September 24, 2001 and "Innovative Program to Develop and Export Brazil's Software", Waldir Arevolo de Azevedo Filho, Gartner Research Note, March 15, 2002.

[19] The Brazilian Software Companies Association (ABES) includes estimates of both legal and illegal software imports along with local production in determining the size of the Brazilian software market. The exchange rate used was 2.20 reals per U.S. $1 (May 2000) which inflates these values, given the significant currency devaluation that has occurred in 2001.

compete against other foreign software developers from Israel, Germany, and France for sales.[20] They have continued to dominate nearly all Internet (e.g., browsers) and electronic commerce-related software and services. These companies have also been successful in marketing a wide range of applications packages and applications development (AD) tools. Sybase, Oracle, Microsoft, and IBM have captured much of the database management systems software market in Brazil. Visual Basic, Cobol, and C++ have been the popular U.S. AD languages, while Sun Microsystems' Java tools have been recently adopted by many Brazilian businesses for their applications development efforts. As would be expected, U.S. suppliers have controlled the operating systems markets for both server and PC platforms as well. Microsoft
Windows' position in low-end servers has been challenged by Novell and various Unix offerings, especially Linux.[21]

Microsoft increases involvement in Brazil, acknowledging market's strategic importance

In an acknowledgment of the importance of the Brazilian market to its business strategy, Microsoft's Chief Executive Officer Steve Ballmer announced in August 2001 that the company will allow eight Brazilian universities to become the first academic institutions in Latin America to access the source code of its Windows operating system so that they can develop new applications programs. The firm also reached an agreement with the Brazilian government to set up six software development centers over the next two years in technology research clusters throughout this country. Microsoft's first two centers will be located in Petropolis and Curitiba.[22]

Piracy in Brazil continues to plague software suppliers

According to the International Intellectual Property Alliance (IIPA), Brazil is still ranked number two after China in losses to industry among the world's major software copyright offenders even though the Brazilian government enacted a law in February 1998 to strengthen intellectual property rights (IPR) protection by imposing on infringers jail terms of up to four years and a fine of 3,000 times the value of the copied software. The IIPA and Office of the U.S. Trade Representative (USTR) both note in recent reports that piracy continues to exist in its traditional forms in Brazil, but that the Internet is also being increasingly used as a way to advertize and distribute illegal software

[20] "Software Market", Industry Sector Analysis , U.S. Department of Commerce, May 29, 2001 and estimates of the Brazilian Software Companies Association (ABES) received from U.S. Commercial Service, Rio de Janeiro on April 1, 2002.

[21] "The Gartner Survey on Java Usage in Brazil", Gartner Research Note, August 31, 2001; "O Que Voce Acha do Linux", Info, September 2001; and "Linux Eleva Participao em 5% Nas Companhias Brasileiras", Computerworld do Brasil, March 23, 2002.

[22] "Microsoft to License Windows' Source Code to Brazil", CNet Investor, August 20, 2001 and "Microsoft to Open Research Centers in Brazil", Brazil News , August 27, 2001.

electronically. USTR, in particular, has found that enforcement is uneven there since the Brazilian government has not given police adequate resources or training to deal with software piracy, the fines provided for in the penal code are too insignificant to act as a deterrent, and the judicial process is often unresponsive and slow. While the software piracy rate in Brazil has dropped from 90 percent in the early 1990s to 58 percent currently, estimated trade losses from business software copyright infringement there alone rose significantly over the previous year to $303.1 million in 2001. As a result of its concern about the magnitude of this problem, USTR accepted the IIPA's petition in January 2001 to review the General Schedule of Preference (GSP) status of Brazil and has elevated Brazil to its 301 Priority Watch List.[23]

Jury still out on Brazilian government and industry anti-piracy efforts

In response to USTR's GSP review, the Brazilian government formed the Inter-Ministerial Committee to Fight Piracy in mid-2001 and vowed that it would launch an all-out war against software piracy since it reportedly costs the Brazilian economy as much as $400 million in lost taxes and 40,000 potential jobs. The committee announced that it would act first to cut down on the pre-installation of illegal software in new systems by infringing computer manufacturers and retailers. It would then target software copyright violations by users in certain key sectors such as the automotive, chemical, and transportation industries. Software industry groups endeavored to attack this problem as well.

Through the first quarter of last year, the Brazilian Software Companies Association (ABES) seized more than 47,000 illegal compact disks (CDs) sold in the streets and downtown open markets of Brazil's largest cities. The Business Software Alliance (BSA) conducted its own campaign, concentrating most of its efforts on bringing legal action against large and medium-sized companies. Large U.S. and Brazilian computer companies, such as Dell, Compaq, and Itautec have also placed pressure on the consumer market to buy legal software. However, both the IIPA and USTR have concluded that there has been no material progress in improving Brazil's anti-piracy enforcement thus far.[24]

Brazil a leader in the Open Source Software ("software libre") movement

Brazilian federal, state, and local governments

[23] 2002 Special 301 Submission: Brazil, the International Intellectual Property Alliance, February 2002; National Trade Estimate Report for 2002: Brazil, Office of the U.S. Trade Representative, March 2002; and "Special 301" Report on Global Intellectual Property Protection for 2002, Office of the U.S. Trade Representative. April 2002.

[24] "Brazil declares war on Pirates", Paulo Rebelo, Wired, May 11, 2001; "Brazilian Government Pledges Zero Tolerance for Pirates", www.ebusinessforum.com, May 12, 2001; interview with Newton Palhano, Executive Director, Brazilian Association of Software and Computer Service Organizations (ASSESPRO), September 20, 2001; 2002 Special 301 Report: Brazil, Intellectual Property Alliance, February 2002; and National Trade Estimate Report for 2002: Brazil, Office of the U.S. Trade Representative, March 2002.

spent only $200 million on software in 2000. The country has been in the forefront of the international debate over whether government agencies should

continue to pay thousands of dollars a month to license proprietary software packages or move to open source (free) software. As in Argentina, this movement has gained some attention due to the high rate of piracy in the public sector and government efforts to reduce costs and balance public spending. Four cities—Amparo, Solonopole, Ribeiro Pires, and Recife—have already passed laws giving preference to or requiring the use of open source software. Other municipalities, states, and the national government have reportedly been considering similar legislation. A Free Software Foundation, established to lead the effort in Brazil, has been lobbying the Brazilian Congress to promote the use of "software libre" while Microsoft has campaigned actively against it.[25] The national government position in late 2001 was that it would not require open source software and still favored competition in the public sector software market. However, the Brazilian Congress is currently considering a bill that would mandate its use. Many small Brazilian software firms have been "hedging their bets" by developing applications solutions in Windows, Linux, and other types of Unix so that they can move quickly to open source. IBM has also been aggressively pushing Linux to its Brazilian server customers in business and government.[26]

Brazilian software tariff issue fraught with uncertainty

Brazil currently has a high import duty for software. Theoretically, a 19 percent tariff should be levied only on the value of the medium (i.e., magnetic disk), not on the intellectual property value of software. However, there have been discrepancies between the understanding of Brazilian Customs agents in certain ports of entry and the software industry on what are the correct tariff classifications and customs valuation rules. Some Brazilian Customs authorities consider CD-ROMS containing games and educational software as audiovisual works (Mercosur Tariff Schedule 8524.39.00) instead of as "discs for laser reading systems" (Mercosur Tariff Schedule 8524.31.00) and have levied a 17.5 percent duty on both the full value of the import (physical media and computer program). They also require the supplier of these kinds of software to obtain an import license. Microsoft asked Brazilian Customs for an opinion on this issue and has received a response supporting the ruling that such products are indeed audiovisual

[25] "Governments Push Open-Source Software", Paul Festa, www.CNetNews.com, August 29, 2001.

[26] Interviews with Newton Palhano, Executive Director, Brazilian Association of Software and Computer Service Organizations (ASSESPRO), September 20, 2001and Wanda Scartezini, National Secretary, Secretary of Information Policy, Ministry of Science and Technology, September 24, 2001.

works, but no clarification on the appropriate tariff treatment thus far. The overall issue of software duties could be resolved by dropping the tariff to zero if Brazil joins either the Free Trade Agreement of the Americas (FTAA) before it is concluded in 2005 or the Information Technology Agreement (ITA) in the future.[27]

Taxes remain a problem too

As far as taxes are concerned, local and state governments also view software as a significant revenue source. Cities have placed a Municipal Tax on Services (ISS) on the sale of software in the past. However, Brazil's Superior Court of Justice excluded packaged software when it upheld a lower court ruling in May 2001 that this tax is only due on custom software (i.e., developed specifically for a particular user). State governments still levy a value-added tax, the Merchandise Circulation Tax (ICMS), applicable to the total value of the software, including the intellectual property content, on both software imports and domestic products. Since these taxes vary from state to state, they handle interstate movements by assessing the tax rate in the state of destination.[28] The State of Rio de Janeiro granted software suppliers significant relief from the ICMS when its governor signed an executive decree in October 20, 2000 to reduce the tax to zero on software imports and to one percent on products developed in that state, including those sold directly to users through download from the Internet or intranets.[29] The 15 percent federal Industrial Products Tax (IPI) has remained in effect. It is assessed only on the value of the medium at the point of sale by the manufacturer in the case of domestically-produced software, or at the point of customs clearance in the case of imports. However, the IPI rebate extension granted in early 2001 was applied to Brazilian software developers as well as hardware manufacturers.[30]

Long-term outlook for IT sales extremely good

The long-term outlook for IT sales in Brazil is extremely good since the Brazilian economy is expected to have a growth spurt of more than 3.5 percent annually over the next few years.[31]

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[27] "Americas: Tariffs and Other Taxes on Computer Hardware and Software", exportit.ita.doc.gov, Office of Information Technologies, U.S. Department of Commerce, February 2001; "Software Market", Industry Sector Analysis, U.S. Department of Commerce, May 29, 2001; and Baker & McKenzie E-Law Alert, February 11, 2002.

[28] "Software Market", Industry Sector Analysis, U.S. Department of Commerce, May 29, 2001 and Baker & McKenzie E-Law Alert, February 11, 2002.

[29] "State Reduces Merchandise Tax on Software Imports", International Market Insight, U.S. Department of Commerce, October 31, 2000.

[30] "Software Market", Industry Sector Analysis, U.S. Department of Commerce, May 29, 2001.

[31] "Economic Outlook, 4Q01: Soldiering On", George Shiffer, Gartner Dataquest Perspective, December 11, 2001.

Barring a return to the energy crisis Brazil endured last year and any further devaluation of the real which would adversely affect business

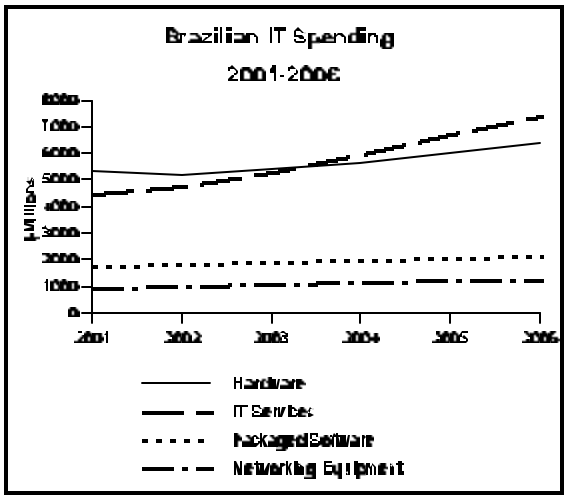

FIGURE 3. Source: IDC,7/02

confidence, the private sector should have larger budgets for IT products and services as it continues to modernize operations. The Brazilian government will also provide a strong stimulus to the market through its electronic government effort and programs to expand computer and Internet use throughout the country, especially in education and among the poor. IDC believes that the Brazilian IT demand will expand at a 6.6 percent average annual rate to $17.3 billion in 2006. (FIGURE 3)

Brazil has the most PCs installed in South America, but lags behind Uruguay, Chile, and Mexico in PC penetration with 6.2 percent of the population using them in 2001, according to International Telecommunications Union estimates. This low level of usage has been a great concern of the Brazilian government. Its efforts along with those of Brazilian states and private sector groups to address the digital divide issue are expected to lead to a substantial increase in PC sales to schools and communities in the near future (see section on the Internet). Growing interest in the Internet and electronic commerce should also act to boost purchases of these systems by businesses, especially SMEs. However, home use has been and should continue to be confined to affluent households since the cost of PCs is still beyond the income of the poorest segments of the Brazilian population. The overall upsurge in PC demand should benefit peripheral sales to some extent. As in Argentina, the ongoing build-out of Brazil's telecommunications infrastructure should push spending on networking equipment. Best prospects for U.S. computer suppliers include desktop and laptop PCs, handheld computers, scanners, printers, storage devices, digital video disk (DVD) players, and networking equipment. Used PCs will also be in demand as low-cost systems for use in Brazilian government projects that target more widespread use of these computers in this country.[32]

Brazil should remain the largest packaged software market in Latin America and an excellent source of opportunities for U.S. companies if Brazilian government and private sector efforts are more successful in controlling piracy in the future. As in the other more advanced IT nations in the region, demand

[32] Interview with Wanda Scartezini, National Secretary, Secretary of Information Policy, Ministry of Science and Technology, September 24, 2001 and "Leading Sectors for U.S. Exports and Investments", Country Commercial Guide for Brazil in 2002, U.S. Department of Commerce.

should be sparked by greater use of PCs in business, education, and the home and the growing involvement of the private and public sectors in electronic commerce and e-government, respectively. Key areas that U.S. suppliers should target include software for ERP, networking and communications, database management, desktop PC applications, Electronic Document Management (EDM), security, development tools and languages, and industrial and commercial automation. Agribusiness, education and training, financial services, health care, retail businesses, telecommunications, and transportation are reportedly the most important vertical markets in Brazil.[33]

IT services should grow the fastest of all IT spending segments in Brazil, nearly doubling in value through 2006, according to IDC. Investment in data warehousing and security services by corporate executives had been an important element of their IT budgets over the past few years, but should become even more critical to them following the terrorist attacks on the United States. Outsourcing of systems and network management and data processing activities has also emerged as a major trend among businesses who are looking to reduce costs. Finally, IT consulting and systems integration services should be in great demand, given the large number of modernization projects going on in both the Brazilian private and public sectors, particularly in banking, health care, rail transportation, and retail industries.

THE INTERNET

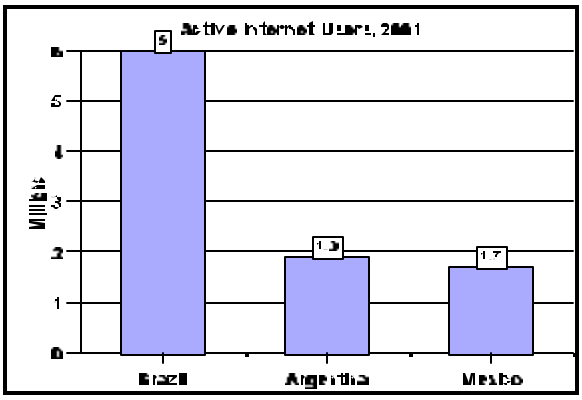

FIGURE 4. Source: Nielsen Netratings

Brazil has largest Internet population in Latin America, but use is still confined to the wealthy

Brazil has the largest Internet user base in Latin America. It had an active online population of about 6 million at the end of 2001, an increase of 23 percent over the previous year's total, despite the economic slowdown.[34] (FIGURE 4) Other estimates suggest that the country had a broader universe of Internet users ranging from 9 million (ABRANET) to 23 million (Ministry of Telecommunications). While growth in usage was certainly impressive last year, Internet penetration (based on active users) was no more than 3.5 percent. PC and Internet use in Brazil

[33] "Software Market", Industry Sector Analysis , U.S. Department of Commerce, May 29, 2001 and "Leading Sectors for U.S. Exports and Investments", Country Commercial Guide for Brazil in 2002, U.S. Department of Commerce

[34] "Internet Use Jumps in Brazil in 2001", International Market Insight, U.S. Department of Commerce, February 2002.

remains confined to the wealthy in urban areas who are currently the only people that can afford PCs and costly Internet access fees and telephone charges. With regard to home PCs, families in the upper 10 percent income group own nearly two thirds of all domestic PCs in use. Internet use is also exclusive with most subscribers belonging to the A and B (upper) social/income classes. Research on adoption patterns shows that Internet penetration among these income classes reached 46 percent in 2001 whereas the rate for other classes of Brazilians was only 4.8 percent. However, as in the case of several Latin American nations, Internet use by businesses has increased rapidly and more than a third of the current Internet population in Brazil accesses it at work.[35]

Infrastructural and socioeconomic barriers continue to limit PC and Internet use

As noted in the previous ExportIT Latin America report, the barriers to greater PC and Internet access in this country have been infrastructural and socioeconomic as they have been elsewhere in the region. Many areas of Brazil still have limited access to electricity and wired telecommunications, although growing cellular telephone use is beginning to make connection to the Internet through wireless Web devices a much more distinct possibility for many Brazilians in the future. Educational attainment and inequitable income distribution are also significant problems. While most Brazilian children go to primary school, just 66 percent of them enroll in high school, which restricts the number of people who are literate enough to use PCs and the Internet. A major gap exists between socioeconomic classes since the top 20 percent of the population controls nearly two thirds of Brazil's wealth and the majority of Brazilians are too poor to afford computers in their homes and to take advantage of the Internet to communicate with others, acquire information, and shop for products and services. One telling statistic is that Brazil lags well behind the five wealthiest Latin American nations in per capita GDP.[36]

Brazilian government and private sector committed to reducing these barriers

The Brazilian government and the private sector have committed themselves to reducing these barriers. They understand they must work together to raise the educational and income levels of the disadvantaged and bring down the costs of PC ownership and Internet access if Brazil is to participate more fully in the Information Age and nurture the growth of

[35] "Brasil.com: A Importancia, Urgencia e Viabilidade da Difusao de ITC", Richard Herson and Eliezer Batista da Silva, Federacao das Industrias do Estado Rio de Janeiro (FIRJAN), April 2001; "Access in Brazil", Jeremiah P.Spence and Laura A.Q. Barbosa, Trends in Latin American Networking, May 2001; "Globalization and Electronic Commerce: Growth and Impacts in Brazil", Paulo Bastos Tigre, Center for Research on Information Technology and Organizations (CRITO), University of California, Irvine, June 2001; and 10th Internet POP Study, IBOPE Midia.

[36] "Access in Brazil", Jeremiah P.Spence and Laura A.Q. Barbosa, Trends in Latin American Networking, May 2001 and "Globalization and Electronic Commerce: Growth and Impacts in Brazil", Paulo Bastos Tigre, Center for Research on Information Technology and Organizations (CRITO), University of California, Irvine, June 2000.

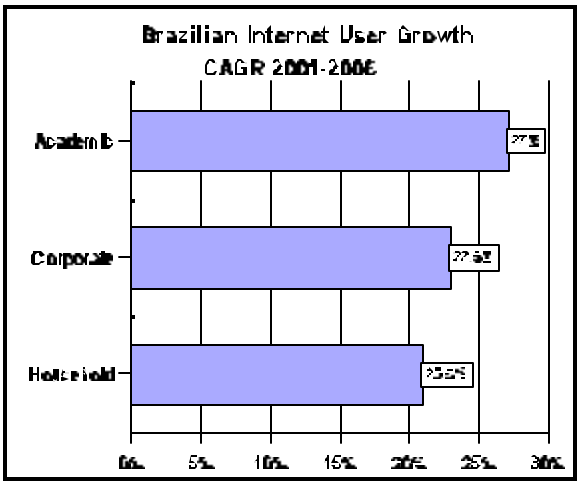

Figure 5. Source: Yankee Group, 7/01

electronic commerce. The National Confederation of Commerce (CNC), in particular, is optimistic that the prospects for more widespread PC and Internet use in Brazil are improving significantly. The Yankee Group, a U.S. IT market research firm, agrees with this assessment. It expects that the number of Brazilian Internet users will triple between now and 2006 to 42.3 million. (FIGURE 5) The market research house forecasts that the next wave of users will include less affluent households, small businesses going online for the first time and large corporations using the Internet more often, and public schools, especially those in urban areas. It notes that this outcome will depend on the success of public and private sector efforts to develop cheaper PCs and increase Internet access in schools and communities.[37]

[37] "Brazil: A Second Wave of Internet Users to Emerge", www.ebusinessforum.com, July 12, 2001 and interview with Luiz Claudio de Pinho Almeida, Economist, National Confederation of Commerce (CNC), September 21, 2001.

Brazil's Information Society Program launched to deal with the Digital Divide

The Brazilian government has been concerned about the growing gap between the rich and poor in the use of PCs and the Internet (the Digital Divide) for many years. In its Information Society Program(ISP), detailed in the Green Book published in October 2000, it has acknowledged the key role that new information and communications technologies can play in addressing economic and social ills. The ISP has focused principally on the services that people usually demand the most in their lives---education, health, and government. The many projects that were initiated in 2001, and are discussed below, are supported by the 2.8 billion reals ($1.2 billion) Fund for the Universalization of Telecommunications Services (FUST) which is financed by a 1 percent charge on the revenue of Brazilian telecommunication services providers.[38] .

Public and private sector target education

The Brazilian government has a plan to use FUST funds to buy 250,000 computers for 13,227 public secondary schools throughout the country, giving some 7 million students access to the Internet by the end of this year. It may extend the project to primary schools later on.[39]

[38] "Will Brazil's Online Government Foster 'Telecommunities'?", W. Arevolo de Azevedo Filho and F. Caldwell, Gartner Research Note, Gartner Group, July 9, 2001.

[39] Interviews with Newton Palhano, Executive Director, Brazilian Association of Software and Computer Service Organizations (ASSESPRO),

The private sector and universities have also embarked on their own education initiatives. Through its "Education for the Future" program, Intel has given $100 million to train 5,000 Brazilian teachers to use computers more effectively for instruction. Microsoft has joined Intel by donating $344 million worth of its Encarta and Office 2000 software to schools. A pilot project was scheduled to begin last October in the cities of Osasco, Marilia, Campinas, and Sao Paulo. Non-governmental organizations such as the Brazilian Association of Software and Computer Services Organizations (ASSESPRO) have become involved as well. ASSESPRO's Viva Favela portal provides a broadband Internet connection to the Internet for Rio de Janeiro's poor at stations located in Rocinha and offers them computer classes and professional courses in addition to information services and free email accounts there. In the area of higher education, the University of Parana launched a work/study program in 2001 to help poor students to receive IT training through distance learning.[40]

IT and the Internet to modernize and provide healthcare to all Brazilians

The Brazilian government has earmarked $200 million to modernize its healthcare system through the use of the IT and the Internet. The National Health Card program has been set up to give Brazilian citizens electronic "smart cards" as part of an effort to automate medical care service in public hospitals and to facilitate access to treatment for patients. Another significant initiative is the establishment of a high speed access network to connect health care professionals and suppliers. Spearheaded by "Dr. Mundi" (a company founded by a group of Brazilian doctors) and supported by two telecommunications firms, this network will link 150,000 points of presence in hospitals, clinics, and medical schools around Brazil by 2004 for a monthly charge of $20. TransAccess, the U.S. company providing access to the broadband technology used in the network, hopes to attract up to 6,500 subscribers from the states of Rio de Janeiro and Sao Paulo alone.[41]

Brazil is the region's leader in giving citizens electronic access to public services

Brazil is the leader in Latin America and is ranked among the top 20 countries globally in the use of electronic government to improve

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September 20, 2001and Wanda Scartezini, National Secretary, Secretary of Information Policy, Ministry of Science and Technology, September 24, 2001.

[40] "Will Brazil's Online Government Foster 'Telecommunities'?", W. Arevolo de Azevedo Filho and F. Caldwell, Gartner Research Note, Gartner Group, July 9, 2001; "Casting a Wider Net in Brazil", Paulo Rebelo, Wired News, July 30, 2001; and interviews with Newton Palhano, Executive Director, Brazilian Association of Software and Computer Service Organizations (ASSESPRO), September 20, 2001 and Wanda Scartezini, National Secretary, Secretary of Information Policy, Ministry of Science and Technology, September 24, 2001.

[41] Interview with Newton Palhano, Executive Director, Brazilian Association of Software and Computer Service Organizations (ASSESPRO), September 20, 2001and "Parallel Internet in the Health Area", International Market Insight, U.S. Department of Commerce, September 29, 2001.

public services and to ensure that every citizen has access to them, according to a recent joint study on networked readiness conducted by Harvard University's Center for International Development and the World Economic Forum. In October 2000, the Brazilian government created a committee composed of five inter-ministerial groups responsible for implementing its Br@sil.gov program, developing universal Internet access in Brazil, and setting up the rules to deliver services and strategic information to all Brazilians. The Brazilian Minister of Telecommunications recently noted Brazil's achievements thus far in electronic government: the use of electronic filing by 92 percent of all citizens to pay income taxes; a nationwide electronic voting system; and a Web portal (www.redegoverno.gov.br) that provides 72 percent of all federal government services on the Internet. The Ministry of Planning and Finance will also begin implementing an e-procurement system for all Brazilian government agencies this year that will cost an estimated 27.5 million reals ($12 million) by the time it is completed in 2006. It launched an e-procurement homepage, Comprasnet, in August 2001 that has been credited with saving the Brazilian government 500 million reals ($217 million) already, due to reduced administrative costs and greater competition among vendors. The site is managed by the Brazilian Small Business Agency (SEBRAE) and now has 661 companies using it to provide quotes on government tenders. To facilitate SME access to Comprasnet, the government of the State of Bahia has begun installing free Internet access terminals at several agencies in the city of Salvador and has plans to establish access points in Feira de Santana and Itabuna.[42]

Project Open Door and state initiatives may help broaden Internet use too

The Brazilian Post Office Agency (ECT) has an initiative called Project Open Door (Projeto Porta Abierta) to provide greater public use of the Internet in over 5,500 Brazilian towns through kiosks equipped with PCs at post offices.[43] The kiosk terminals will allow people in each community free access for a ten minute period to the Internet for government services and activities such as online shopping and email. The ECT announced in December 2001 that it will spend 260 million reals ($113 million) to set

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[42] "E-Gov Executive Committee", International Market Insight, U.S. Department of Commerce, February 7, 2001; "Will Brazil's Online Government Foster 'Telecommunities'?", W. Arevolo de Azevedo Filho and F. Caldwell, Gartner Research Note, Gartner Group, July 9, 2001; "E-Procurement", International Market Insight, U.S. Department of Commerce, December 28, 2001; The Global Information Technology Report 2001-2002: Readiness for the Networked World, Geoffrey Kirkman et al., Center for International Development, Harvard University, and the World Economic Forum, March 2002; and "Gov't Facilitates SME Access to Comprasnet", Business News Americas, May 6, 2002.

[43] While it was still the Brazilian telecommunications services monopoly, Telebras launched a telecommunity center project in 1992 that had the goal of establishing 13, 000 centers across Brazil by 2000. The centers were to have been a combination of Internet access point, small business services, and a government services portal. The project was canceled after Telebras was privatized. "Strategies for Improving Access to the Internet", Jeremiah P. Spence and Laura A. Q. Barbosa, Trends in Latin American Networking, May 2001.

up these kiosks and will issue bid contracts to develop and produce 5,690 web access terminals for installation across Brazil by 2003. The first phase is scheduled to be completed in June 2002. The program should benefit at least 1.2 million people during the first year of operation and perhaps more than 4 million by 2004. The Brazilian government plans to launch another project in 2002, called the Permanent Electronic Address (PEA), to give every Brazilian a free private email account to use at these kiosks. [44]

This effort is being supplemented by the Internet initiatives of state governments and the Brazilian private sector. The State of Sao Paulo launched its "People on the Internet" program in December 2001 which will install 2,000 Public-Access Terminals (TAPs), modified PCs, located in subway stations, low-income housing projects, and government agencies providing public services throughout that state this year. The project has stimulated interest among businesses, such as fast food chains, retail shops, and bank branches, who want to adopt TAPs to attract customers. For example, NetCash-PopBanco (a private enterprise), Caixa Economica Federal, Globo Cabo (a cable Internet provider), Telefonica Empresas (the businesss division of a telephone company) have banded together with a bakery industry union and a bread industry association to install free Internet kiosks in neighborhood bakeries (padarias) in Brazil. The kiosk program will provide registered users with banking services, email, and free access to the Internet and will be financed by fees for financial services, commissions on electronic commerce transactions, and advertising.[45]

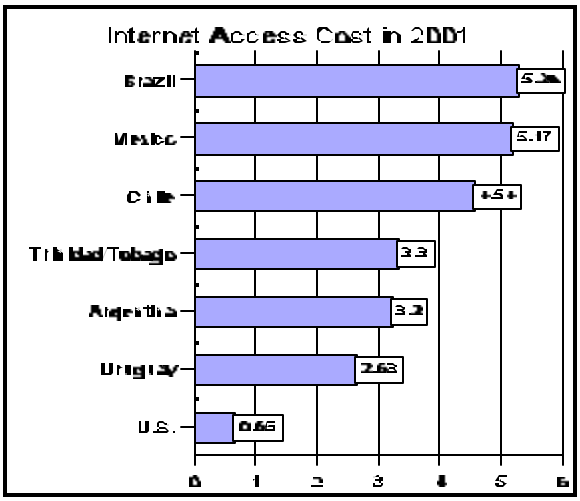

FIGURE 6. Source: CID, Harvard Univ. and IBOPE-Nielsen NetRatings

High access and use costs: another barrier for the Brazilian government

The costs of accessing and using the Internet in

[44] "Brazil: Internet Barriers to Fall", Wired News, November 7, 2001; "E-Government Overview Presented to European Union" and "ECT to Implement Internet Kiosks and Virtual Shopping", International Market Insight reports, U.S. Department of Commerce, December 28, 2001; and "Brazil: Let's Go Postal", Paulo Rebelo, Wired News, May 15, 2002.

[45] "Making Low-Cost Internet Access a Reality in Brazil", Noah Elkin, www.emarketer.com, February 9, 2001; "Sao Paulo Has a Great Idea for Conquering the Digital Divide", Waldir Arevolo de Azevedo Filho and Cassio Dreyfus, Gartner First Take, Gartner Group, December 17, 2001; and "Sao Paulo Launches a Cheap Internet Service for the Underprivileged", International Market Insight, U.S. Department of Commerce, December 21, 2001.

Brazil are very high. According to the study prepared by Harvard University's Center for International Development and the World Economic Forum, Brazil's average Internet service provider (ISP) charge for twenty hours of monthly Internet access as a percentage of GDP per capita was more than eight times greater than that in the United States and roughly twice as much as those in Uruguay and Argentina. (FIGURE 6) Free Internet access has also become less available. UOL, the largest Brazilian ISP, Terra, and Tutopia have all dropped this service and another leading provider, Super 11.net, went out of business entirely last year because of their inability to generate any profits from advertisements and special content offerings. As a result, only Internet Gratis (iG) and newcomer Ibest still provide free access (although free academic and banking sites remain in operation).[46] Basic telephone costs are another hindrance to the growth of Internet use in Brazil. Connection and monthly subscription fees for home service are approximately $69 and $13 respectively, while the current charge for a local call is about 3 cents for every four minutes.[47] The Brazil's National Telecommunications Agency (ANATEL) recently announced two options on March 22 this year to make Internet access cheaper and more available. Both options it has developed involve "flat" fees that will be set for each type of connection and eliminate the duration or time of access charge which is in effect currently. ANATEL has submitted these options for private and public comment and, based on the responses it receives, will implement one of them this August.[48]

Dotcom bust comes to Brazil

Brazil experienced the same dotcom shakeout that occurred in the United States and many other developed nations from late 2000 onwards. This country originally had 1,561 ISPs after Bradesco, Brazil's largest bank, sparked an explosion in free access services in December 1999 and U.S., European, and Brazilian telecommunications firms ushered in a new wave of investments in Internet services businesses over the next six months. New free ISPs, such as Internet Gratis (iG) and Super 11.net, came into the market and eventually forced ISP leaders UOL, Terra Networks, and Starmedia (U.S.) to offer similar services along with their paid ones or face losing market share. However, by July 2000, the ISP business entered a period of consolidation that would last for more than a year. Several of the free Internet

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[46] "Free Internet Provider Index", ISPnet Brasil; "Brazil: Setback for Free Internet Access", www.ebusinessforum.com, February 16, 2001; The Global Information Technology Report 2001-2002: Readiness for the Networked World, Geoffrey Kirkman et al., Center for International Development, Harvard University, and the World Economic Forum, March 2002; Marcelo Coutinho, IBOPE-Nielsen NetRatings, March 2002; and "UOL Undeterred by Argentine Crisis", Business News Americas, April 11, 2002.

[47] "Confronting the High Cost of Internet Access in Brazil", Noah Elkin, www.ebusinessforum.com, March 1, 2001 and interview with Ana Paula Lobos, Assistant Editor, Computerworld do Brasil, September 21, 2001.

[48] "Flat Rate Access to Expand Internet Usage: ANATEL Announces Two Options for 2002", International Market Insight, U.S. Department of Commerce.

access firms who were competing for a limited amount of advertising dollars had less than expected revenue growth and mounting debts and had trouble retaining customers when the quality of their services decreased. As investment from venture capitalists dried up, many of them either closed their doors or were forced to diversify into more lucrative areas, such as content and network services, and Web hosting and design, to survive. Acquisitions and mergers among other major ISPs intensified as well. The turmoil was so severe that less than 700 ISPs reportedly remained by mid-2001.[49]

The ISP market is now controlled by a handful of players. UOL and iG of Brazil occupy the first and second positions in a ranking of the leading ISPs in that country with a unique audience of 5.2 million and 4.5 million users, respectively, in March 2002. Yahoo! of the United States, by virtue of its acquisition of Cade? from StarMedia last January, and Brazil's Globo.com are tied for third with 3.8 million users followed closely by Terra Lycos. U.S. firms, MSN, AOL, and Microsoft, have also emerged as major competitors. StarMedia is still a participant in the market, but has refocused its business on corporate accounts and the mobile Internet.[50] Further consolidation of Brazil's ISPs is expected this year since many of them are still unprofitable or are struggling to break even despite gaining the bulk of their revenues from paid subscribers.[51] All were adversely affected in late 2001 by the slump in Brazilian demand caused by the sluggish world and Brazilian economies, local energy rationing, and the sharp currency devaluations in Brazil and neighboring Argentina. Some improvement in their fortunes is likely in the near future though as Brazil's economy picks up and Internet use spreads among the middle class, small businesses, and schools.[52]

Web hosting and Internet Data Centers promising

Two areas of potential opportunity for U.S. suppliers in Brazilian Internet services are the web hosting and Internet data center (IDC) businesses even though they have taken off slowly thus far throughout the region. Frost and Sullivan, a U.S. market research house, believes that the Brazilian market for these Internet

[49] "Brazil: Pressure on Internet Sector to Generate Profits", www.ebusinessforum.com, September 22, 2000; "Brazil: Dotcom Turmoil Affects Incoming Investments", www.ebusinessforum.com, February 20, 2001; "Content in Latin America: Understanding Diversity", Gartner Research Note, Gartner Group, February 22, 2001; and interview with Murillo Marques Junior, President, Brazilian Association of Internet Service Providers (ABRANET), September 20, 2001.

[50] "Novo Recorde Para a Web Brasileira", IBOPE eRatings Press Release, April 12, 2002.

[51] The surviving Brazilian ISPs currently gain 70 percent of their revenues from access fees, 20-25 percent from advertising, and 5 percent from electronic commerce, according to a recent survey conducted by Globo.com, a local content portal. "LatinAm E-Business Weekly Wrap", Business News Americas, May 2, 2002.

[52] "Brazil Internet Giant UOL's Net Loss Doubles in 2001", ISP World, April 8, 2002 and "Brazil's Globo.com Pins Turnaround on Broadband", Adrianna Garcia, ISP World, April 9, 2002.

services will increase at an average annual rate of 212 percent from 2001 to $447 million in 2006. This firm believes that Brazilian business users will soon see the benefits of outsourcing all of their website needs and avoiding the burden of expensive initial investments in telecommunications, network, and computing infrastructures, as well as the in-house personnel required to run them. Diveo, IBM, and Optiglobe of the United States are already offering these services in Brazil and, together with .comDominio, Embratel, and Telefonica, hold an estimated 73 percent of Brazilian IDC demand.[53]

Brazil takes NAPs to improve local Internet performance

Brazil has been successful in its efforts to improve Internet performance and efficiency by establishing Network Access Points (NAPs) there last year. Diveo Broadband Networks of the United States announced in March 2001 that it had signed up eight of Brazil's leading ISPs to connect to the first private NAP in that country. Prior to this development, traffic going from one ISP to another in Brazil and other Latin American countries usually had to pass through public NAPs in the United States before it ultimately returned to the region, increasing latency and packet loss for Latin American Internet users and thereby degrading network performance. The Brazilian Association of Internet Service Providers (ABRANET) followed by launching the first public NAP in Sao Paulo last June to link together its consortium of 250 providers (which are responsible for 85 percent of all the data traffic in Brazil) and to provide peering between them. The consortium also plans to build other NAPs in Rio de Janeiro, Brasilia, and Belo Horizonte. NAPs are seen as a necessary prerequisite for the expansion of Internet use in the Brazilian business community and, as a result, growth in electronic commerce.[54]

Broadband in early stages of development

Dial-up Internet access remains pretty much the rule in Brazil. Although only 8 percent of all users and 32 percent of Brazilian businesses are connected to the Internet through high-speed links, interest in broadband is reportedly growing there. Brazil is ranked second after Argentina in the region in terms of its broadband readiness, but lags behind the United States and many European and Asian nations as far as its growth potential is concerned. This country has had a substantial amount of fiber optic cable installed (including that laid by power utilities) in recent years, most of which has not been used yet, and thus has a good foundation for broadband services.[55] Digital Subscriber Line

[53] "Centros Nervosos", Renata V. Mesquita, Information Week Brasil, June 11, 2001and "Internet Data Centers: A Flourishing Source for Product Development and Financial Profitability in Latin America", Romina Adduci, Research Analyst, Latin American Communications & IT, Frost and Sullivan, December 13, 2001.

[54] "First Private NAP on Tap for Brazil", ISP World, March 14, 2001 and "Abranet Selects SAVVIS to Help Launch First Public Internet Service in Brazil", Business Wire, June 2001.

[55] "Global Prospects for Broadband Internet", Noah Elkin, www.ebusinessforum.com, March 13, 2001; interview with Joao Carlos da Fonseca, Editorial

(DSL) and cable are the main wired broadband technologies offered, and Integrated Services, Digital Network (ISDN) is used in certain areas of Rio de Janeiro and Sao Paulo. Deployment of DSL within Brazil, in particular, expanded from only 20,000 lines at the end of 2000 to 232,700 by the end of last year, according to Point- Topic, a British telecommunications market research firm. This

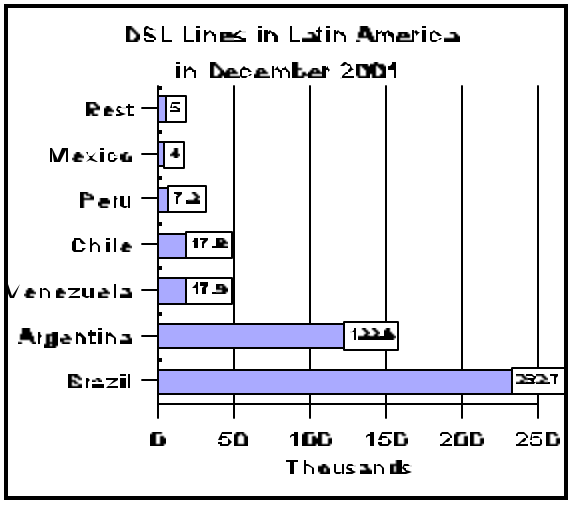

FIGURE 7. Source: Point-Topic, 4/02

figure accounts for more than half of all such subscribers in the region. (FIGURE 7) IDC expects that Brazil's DSL subscriber base may reach 3.5 million by 2005. TVA cable television offers high speed Internet access through cable modem technology.

Broadband connections are still expensive services in absolute terms so providers have targeted them at high income residential customers and, in the business sector, at small and medium-sized enterprises. Large corporations typically require faster and more secure, dedicated T1 and T3 lines that they lease from telecommunications carriers. DSL companies have traditionally charged as much as $110 on the average for installation and another $35 -$40 per month for 256 kilobyte (KB) residential service. However, the competition fostered by telecommunications deregulation in Brazil has brought charges down significantly over the past few months. Telefonica, for example, announced that it was lowering its installation fee down to $33 in March 2002 , putting DSL in the range of ISDN and cable modem charges. If wired broadband is to become more widely used in this nation, carriers must not only continue to cut prices of their services, but must also maintain a high level of investment in expanding their infrastructures and promoting the benefits of high-speed connections. These advantages include providing 24-hour online connection free of telephone charges and delivering sophisticated applications such as teleconferencing, interactive entertainment, and distance learning.[56]

Director, Associacao Brasileira de Telecommunicaoes, September 21, 2001; "8% Dos Internautas Posseum Accesso Rapido", 11th Pesquisa Internet POP, IBOPE Midia, October 24-November 6, 2001; and Harte Hanks survey of businesses with high-speed Internet access in www.ebusinessforum.com chart, December 4, 2001.

[56] "Confronting the High Cost of Internet Access in Brazil", Noah Elkin, www.ebusinessforum.com, March 13, 2001; "Is DSL LatAm's Route to Broadband?", Juan Carlos Perez, IDG News Service Latin America, February 6, 2002; "Brazil's Globo.com Pins Turnaround on Broadband", Adrianna Garcia, ISP World, April 9, 2002; DSL Worldwide Retail Directory Overview, Edition 5, Point Topic Ltd., April 2002; and "Andrade on DSL Latin America", Michael Andrade, DSL Prime,

Satellite emerges as an expensive broadband alternative in remote areas

Satellite has emerged as another broadband option, particularly for Brazilians living in distant regions that do not have an adequate wired telecommunications infrastructure. After being confined to just Rio de Janeiro and Sao Paulo, a joint venture of UOL, Star One (a partnership of Embratel, Brazil's largest telecommunications firm, and satellite operator SES Astra) and Gilat Satellite Networks' StarBand Latin America announced last October that they would provide satellite Internet access in the northeast, southeast, and southern sections of Brazil by the end of 2001. However, the cost of satellite access, with a $500 installation fee and a $150 monthly service charge, is even greater than traditional wired broadband services which will undoubtedly limit growth in customers to business users until prices come down substantially.[57]

WAP promising as a way to access the Internet

Wireless has some promise in Brazil as well, given the relatively low PC penetration rate and the popularity of cellular telephones there (a 27.8 million subscriber base in 2001 which is expected to nearly double over the next four years, according to Baskerville Communications Corporation). The first Wireless Applications Protocol (WAP) services were launched in this country in June 2000. Since that time, web-enabled phone penetration has risen to about 7 percent of the Internet population and the distribution of those accessing the Internet through these devices has been relatively even across social classes. Various studies show that WAP has become much more accepted by business and home users. About 1.9 million Brazilians intend to purchase a WAP phone in the near future. In addition, wireless providers believe that Brazil will be a regional leader in this technology by 2004 and expect that revenues from wireless Internet services and content will reach $1.65 billion by then while those from mobile e-commerce will exceed $660 million.[58]

ELECTRONIC COMMERCE

Brazil has the most developed networked economy in Latin America

April 2002.

[57] "Satellite ISP Sambas South" Joanne Glasner, Wired News, May 15, 2001 and "Brazil Looks to Heavens for Net", Paulo Rebelo, Wired News, October 26, 2001.

[58] "Latin America: The Middle World", Julia Scheeres, Wired News, January 25, 2001; "Access in Brazil", Jeremiah P. Spence and Laura A. Q. Barbosa, Trends in Latin American Networking, May 2001; "Latin American Mobile Web Growing", www.emarketer.com, June 1, 2001; and "Mobile Phone Subscribers in Brazil, 2001, 2005, 2010", www.emarketer.com, May 8, 2002.

Although well down in the ranking for its network readiness (which measures network use and such enabling factors as network access and policy), Brazil has the most

Networked Economy Index for Major Latin American Nations

Brazil	4.01
Chile	3.80
Argentina	3.71
Uruguay	3.67
Mexico	3.57

Source: CID, Harvard University/WEF

developed networked economy in Latin America, according to the previously cited joint Harvard University Center for International Development and World Economic Forum study. This position reflects this country's strength not only in electronic government, but also in electronic commerce (e-commerce) and general infrastructure. Recent estimates of the size of Brazil's e-commerce market in 2001 range widely from $2.1 billion (Fundacao Gertulio Vargas, a major Brazilian economic and business research institute) to $5.3 billion (IDC). Most observers feel that e-commerce grew steadily last year even though Brazilian businesses and consumers had to deal with the sluggishness of the national and global economies, Brazil's energy crisis, the depreciation of the Real, and the Argentine crisis. One of the factors driving its growth in this country is strong government support for greater use of IT and the Internet within Brazilian society to bridge the Digital Divide and to boost Brazil's economy. Another is a mounting interest within Brazilian industry in doing e-business to reduce costs and increase operational efficiency and, thus, competitiveness. IDC expects that e-commerce in Brazil may increase at an average annual rate of 57 percent to over $20 billion by 2004, with business-to-business (B2B) still accounting for most of this activity.[59]

B2B drives electronic commerce in Brazil

Business-to- business (B2B) transactions account for the bulk of Brazil's e-commerce. (FIGURE 8) Even if the most conservative estimate of Fundacao Getulio Vargas is used, B2B reached $1.6 billion in 2001, retaining Brazil's position as the largest and most active market in the region. Brazilian firms involved in B2B had great expectations last year and set a

[59] "E-Commerce and Internet Services-An Overview", International Market Insight, U.S. Department of Commerce, July 27, 2001 and "E-Commerce no Brasil: $2.1 Bilhoes em 2001, Diz FGV", Computerworld do Brasil, March 22, 2002.

goal to more than double their Internet-related revenues and investments from 2.4 percent of sales in 2000 to 5.6 percent by year-end, according to IDC.[60]

Finance and retailing remain leading B2B users

Various e-commerce initiatives have emerged in Brazil over the past two years focused on: electronic procurement of basic supplies (e.g., Embratel in telecommunications and Copene in petrochemicals); electronic marketplaces operated by automotive, chemical, agricultural, and construction companies to trade goods and services within their respective industries; and vertical portals for transactions among industries participating in one supply chain (e.g., Transora, a multinational consumer goods consortium, which includes Coca Cola and Sara Lee). However, finance and retailing continue to lead B2B e-commerce. The financial sector, which has traditionally been at the forefront of service automation, has invested in 136 Internet sites and thirty four ISPs since late 1999, and recently launched a nationwide online interbank funds transfer system. In retailing, major supermarket chains such as Pao Acucar, Carrefour, and Lojas Americanas all manage their procurement and logistics operations over the Internet[61].

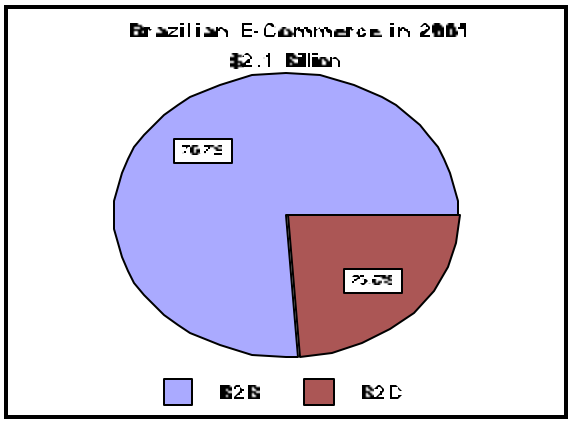

FIGURE 8. Source: FGV, 3/02

Most at early stage of B2B; large corporations are most advanced

Although the majority of Brazilian businesses have access to the Internet, most are still at an early stage of e-commerce development since more than half use the Internet only for email and information gathering purposes, according to surveys conducted by the Center for Research on Information Technology and Organizations (CRITO). Those micro firms (less than 10 employees)and small companies (10 to 50 employees) that are already in e-business are fairly sophisticated users. They are generally high tech enterprises engaged in software development, consulting, and specialized products and services that purchase more through the web and provide more technical services online than larger companies. Medium-sized firms on the Internet have web sites that

[60] "Latin America Plans to Leverage the Internet", eBusiness Trends, International Data Corporation, August 23, 2001 and "Browsing Brazil's eMarketplaces", eMarketer B2B Weekly, Issue 30, 2001.

[61] "Brazil: B2B Internet Commerce Starts to Blossom", www.ebusinessforum.com, September 12, 2000 and "Globalization and Electronic Commerce: Growth and Impacts in Brazil", Paulo Bastos Tigre, Center for Research on Information Technology and Organizations (CRITO), University of California, Irvine, June 2001.

present their products, services, and institutional information, but they do not normally undertake transactions online because the investments required to do so are too large a percentage of their total revenues and qualified IT personnel are in short supply. By contrast, large and very large Brazilian corporations (more than 500 employees) are very advanced e-commerce users. They are at the transactional stage and are intent on using the Internet to increase their productivity, develop new marketing channels, and induce their business partners to adopt their standards and operational practices. They market and sell their products and services online, transfer money electronically, and integrate their logistics with suppliers and customers. The e-commerce applications that are particular to them include supply chain management (SCM), Extranets, and Intranets.[62]

Brazil must overcome difficulties to stimulate greater B2B use

Despite the growing awareness of the advantages of B2B e-commerce, most Brazilian firms must overcome a number of difficulties before they can move beyond rudimentary uses of the Internet. Like consumers, they are worried about privacy and the security of online transmissions of confidential information. They also have a great need for qualified people to implement and operate the IT infrastructure that supports e-business. For example, IDC estimates that Brazil will have 403,000 job vacancies just in the area of networking through 2004, but will only have 155,000 IT professionals capable of filling this demand. And, finally, some Brazilian and foreign companies complain about the inadequacies of the telecommunications infrastructure in Brazil, especially the limited access to high speed digital lines and the low quality of transmission. Both the Brazilian private and public sectors understand that they must continue to work together to address these concerns through the development of appropriate e-commerce policies, the expansion of IT training, and telecommunications deregulation and investment.[63]

Brazil leads the way in B2C

Brazil leads Latin America in online retailing, accounting for more than half of Internet sales in this region. Fundacao Getulio Vargas estimates business-to-consumer (B2C) e-commerce in Brazil reached $500 million and claims that the number of online transactions surged in 2001. On the plus side, this country has the most advanced e-commerce industries and the largest Internet population in the region, a wide range of Portuguese-language content providers, and a sophisticated home banking system with state-of-the-art equipment. According to a Brazilian Chamber of Electronic Commerce (Camara-

[62] "Globalization and Electronic Commerce: Growth and Impacts in Brazil", Paulo Bastos Tigre, Center for Research on Information Technology and Organizations (CRITO), University of California, Irvine, June 2001 and interview with Rui Mendes, Country Manager, IDC Brasil, September 25, 2001.

[63] "Globalization and Electronic Commerce: Growth and Impacts in Brazil", Paulo Bastos Tigre, Center for Research on Information Technology and Organizations (CRITO), University of California, Irvine, June 2001.

e.net) report published in March 2002, more than 3 million Brazilians purchased online in 2001. Those buyers who spent the most money had a monthly income of between $429 and $2,159, purchased mainly music compact discs(CDs), books, software, and electronic goods, and doled out an average of $214 each month on their online purchases. Another report released about the same time by the Internet pollster E-Bit points to two trends that are favorable to the development of B2C in Brazil---that many of these shoppers purchased for the first time in 2001 and that most of them would buy again from the same retailer. However, despite Brazil's advantages in the area of B2C, the number of active online buyers represented less than 20 percent of all Brazilian Internet users.[64]

More widespread use of B2C still hindered by barriers

As in several other Latin American nations, B2C's share of total Brazilian electronic commerce is still relatively small (24 percent) compared to B2B and more widespread use is limited by socioeconomic, cultural, and infra structural barriers. Buying over the Internet has been and will continue to be confined to the upper and middle classes in the near future because the majority of Brazilians have little disposable income to afford computers, software, telecommunications services, and most of what is offered online. Brazilian Internet users and retailers remain concerned about security, despite the increasing use of secure systems. For example, three fourths of online buyers in the March 2002 Camara-e.net survey indicated that they do not feel safe using their credit cards and providing financial information over the Internet.[65] Although Brazilians "surf the Web" to acquire information on products and services, few close the deal online. Many still prefer to patronize local stores and malls because they enjoy shopping with family and friends and believe that the price differential on goods is larger for online than for "brick and mortar" purchases. The Brazilian transportation infrastructure is also a problem in that it restricts the delivery of products bought on the Internet. Since roads are poor and airports are few in number throughout the country, postal and other delivery systems are unable to handle large volumes of small packages. As a result, most of the 900 stores using B2C in Brazil serve only small areas.[66]

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[64] "E-commerce Keeps Brazilian Internet Alight: Retail and B2B Online Transactions Could Double Every Year", Thierry Ogier, Financial Times, January 18, 2002; "E-commerce no Brasil: U.S. $2.1 Bilhoes em 2001, Diz FGV", Computerworld do Brasil, March 22, 2002; "Average Online Purchase at U.S.$91.30-Brazil", Business News Americas, April 1, 2002; and "E-Shoppers Spend U.S.$214/Month-Brazil", Business News Americas, April 2, 2002.

[65] The lack of coherent privacy policies on B2C sites discourages potential online buyers from making purchases over the Internet. A joint study conducted in 2002 by Price Waterhouse Cooper and E-bit, a Brazilian consultant, shows that only 35 percent of registered B2C sites have privacy policies. Moreover, 86 percent of Brazilian Internet shoppers surveyed did not make a purchase in the end on sites where such policies existed because these privacy statements were unclear. "Privacy Policy Deficiencies Stunt B2C Growth", Business News Americas, June 5, 2002.

[66] Interviews with Rui Mendes, IDC Brasil, September 25, 2001 and Paula Secaff, Vice President,

The retail sector is the major B2C player

The major B2C players in Brazil are diverse companies in the retail sector. They dominate Internet sales volume and include Amelia.com, the online site of Pao de Acucar (Brazil's second largest supermarket chain), Americanas.com (a major retail chain marketing a wide range of consumer goods), Livraria Saraiva (a bookstore chain), Webmotors (used-car sales), and Submarino.com (books and CDs). Many of these operations are reportedly unprofitable, but they are considered invaluable in building strong brand recognition. Several Brazilian retailers have made concerted attempts to bring more consumers online. Magazine Luisa (consumer electronic and home appliances), for example, has established "e-shops" (Internet kiosks operated by a single clerk) to extend its reach to an extra 25 locations beyond the 88 "bricks-and-mortar" stores it owns.[67] The automotive sector in Brazil has also been an active participant in online sales and reportedly chalked up customer penetration rates that have not been equaled yet in any other market. Fiat (Italy), Ford, General Motors (GM), and Volkswagen (Germany) have all made concerted efforts to sell low-priced cars over the Internet in Latin America. A Boston Consulting Group (BCG) study published in late 2001 estimated that direct automotive sales in this region would rise nearly 400 percent in that year, most of which would be in Brazil. GM's experience with online sales has gone so well that it announced plans to offer additional models on its website and to build three new distribution centers in that country to speed delivery to its Brazilian customers.[68]

Brazil at the cutting-edge in home banking

Home banking is another significant online activity in Brazil. In the early 1990s when it was faced with hyperinflation and extremely high interest rates, Brazil began building one of the most advanced electronic banking systems in the world to clear checks and allow customers to pay their bills as quickly as possible. Bradesco, Brazil's largest private bank, was a pioneer in home banking, being the first in that country to put a financial site on the Internet when it launched "BradescoNet" in 1996. Two years later it developed a safe shopping environment for its customers by creating a "virtual mall" and allowing users to make purchases through the use of an "electronic wallet" (a smart card). Unibanco also introduced the world's first virtual credit card, the "e-card", in conjunction with

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StarMedia, September 26, 2001, and "BCG/VISA Study: Latin American Online Retailing to Reach $1.28 Billion (U.S.) In 2001", BCG Media Release, Boston Consulting Group, November 13, 2001.

[67] "E-Commerce and Internet Services-An Overview", International Market Insight, U.S. Department of Commerce, July 27, 2001; interview with Rui Mendes, IDC Brasil, September 25, 200; and "Business Latin America: Online Retailing Bucks Economic Downturn:, www.ebusinessforum.com, December 18, 2001.

[68] "Internet Car Sales on the Rise", International Market Insight, U.S. Department of Commerce, July 30, 2001; "BCG/VISA Study: Latin American Online Retailing to Reach $1.28 Billion (U.S.) In 2001", BCG Media Release, Boston Consulting Group, November 13, 200; and "Online Auto Sales Rev Up in Latin America", Noah Elkin, www.ebusinessforum.com, February 27, 2002.

Mastercard in October 2000 to provide for secure e-commerce transactions.[69]

IDC forecast in early 2001 that there would be 4.9 million home banking users in Brazil by year-end versus 1.5 million in 1999. An article in Business Latin America claims that up to 24 percent of some banks' customer bases are now engaged in online financial transactions and that 16 of the top twenty Brazilian financial institutions (87 percent of the country's banking system in terms of assets) offer Internet banking. These Brazilian banks have been working hard to expand its use over the past year. They have provided significant funds to finance the purchase of PCs by many more Brazilians, remain among the few ISPs that offer free Internet access to customers, and some have even dropped fees for most online transactions. In addition, 65 percent of them have provided mobile banking services through WAP-enabled handheld devices. Electronic banking should receive an enormous boost in 2002 with the introduction in mid- April of the Brazilian System of Payments (SPB). This interbank settlement program will allow immediate nationwide online funds transfer among banks, businesses, and consumers, replacing checks in B2B and B2C transactions. Brazil's Central Bank believes the new system will handle 14 million transactions worth an estimated $7 billion each day.[70]

C2C beginning to grow

Consumer-to-consumer (C2C) auction sites have emerged in Brazil over the past year or so, but play even less of a role in Brazilian e-commerce than B2C does. MercadoLibre is one of the leaders in Brazil along with Arremate.com and Lokau. MercadoLibre has been aggressively pursuing various strategic partnerships and cross-marketing accords with other multinational and local enterprises to bolster its position in this market and throughout the region and to survive the ongoing consolidation of Latin American dotcoms. In October 2001, this online auctioneer gave eBay a 19.5 percent stake in its operations in exchange for the U.S. firm's iBazar subsidiary in Brazil. This deal added 450,000 registered users to its customer base. Businesses have also
become more involved in online auctions of products recently. Most of them have been small enterprises who have been responsible for a significant share of transaction volume.[71]

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[69] "E-Commerce and Internet Services", International Market Insight, U.S. Department of Commerce, March 30, 2001 and "E-Banking: Brazil Leads Latin America", International Market Insight, U.S. Department of Commerce, April 24, 2001.

[70] "Globalization and Electronic Commerce: Growth and Impacts in Brazil", Paulo Bastos Tigre, Center for Research on Information Technology and Organizations (CRITO),University of California, Irvine, June 2001; "Brazilian Banks: Exploiting the Internet", www.ebusinessforum.com, August 28, 2001; "Internet Financial Services on the Rise in Latin America", M. Kun et al., Gartner Research Note, September 21, 2001; and "Certisign Sees Digital Certification Market Growing 500%", Karen Keller, Business News Americas, April 19, 2002.

[71] "E-Commerce and Internet Services-An Overview", International Market Insight, U.S.

ELECTRONIC COMMERCE ISSUES

General legislation covers e-commerce in Brazil, but disputes are often the rule

Brazil does not currently have any specific legislation that regulates e-commerce. However, the Brazilian Civil Code and other general legislation is applicable to transactions that take place on the Internet. In some e-commerce transactions where disputes have arisen, the resulting court cases have exposed some shortcomings in Brazil's current legal regime with regard to these transactions. Bills which address the particular legal issues raised by e-commerce and stipulate regulations supporting its development in this country have been under consideration in the Brazilian Congress for some time. Most of the legislative action has been directed toward digital security.

Foreign firms now allowed to register domain names

The Foundation for Research of the State of Sao Paulo (FAPESP), the only entity in Brazil allowed to register domain names and distribute Internet protocol (Ips) addresses, issued a regulation in March 2001 that authorized foreign entities to register Brazilian domain names. The action was a step forward since only Brazilian individuals and entities incorporated in Brazil with a Brazilian Federal Taxpayers' Registry (CNPJ) number were previously authorized to do so. The new regulation abolished this requirement and stated that a foreign entity only needed to be represented by a Brazilian agent with a power of attorney to act on its behalf, if it did not have a presence there. However, several days later, FAPESP retreated from this position somewhat and issued a regulation that now requires foreign entities to file an affidavit of commitment to incorporate a subsidiary in Brazil within a year of registration.[72]

Domain name ownership remains a murky business though

FAPESP has usually allowed the first applicant who satisfies the requirements of the Brazilian Internet Management Committee's Resolution Number 1 of April 15, 1998 to be the domain title holder. It does make an effort to restrict the registration by third parties in Brazil of famous marks that are on a 1997 list of 200 names compiled by INPI, the Brazilian Patent and Trademarks agency, but does not protect those marks that were not on the list then. FAPESP also does not have the legal authority to resolve conflicts between parties or to determine who is the rightful owner of a specific domain name. Because of the lack of any specific legislation that guarantees ownership of domain names,

Department of Commerce, July 27, 2001; "Latin America: Top E-marketers Join Forces", www.ebusinessforum.com, October 30, 2001; and "Business Latin America: Online Retailing Bucks Economic Downturn:, www.ebusinessforum.com, December 18, 2001.

[72] "Brazil: Domain Names Available to Foreign Entities", www.ebusinessforum.com, May 11, 2001 and "New Ruling for the Registration of Domain Names", Observador Legal, June/July 2001, Noronha Advogados.

many foreign trademark holders are forced to settle disputes with "cyber squatters" in the courtroom. Brazilian courts have made divergent rulings in the past though. America Online lost its claim to the web address www.aol.com.br to Milenio, a regional portal in the city of Curitiba, that had already registered it. By contrast, Embratel, a major Brazilian telecommunications supplier, won the rights to its domain name over a previous claimant. Both FAPESP and INPI have entered into a cooperative agreement to handle disputes by avoiding the registration of any marks as domain names by entities other than the registered mark owner. INPI has proposed to share its database and expertise in trademark disputes with FAPESP. FAPESP, in turn, has been considering, along with the Brazilian Association of Intellectual Property (ABPI), the possibility of creating an administrative council within its organization to review contested registrations.[73]

Online buyer rights covered under the Consumer Protection Code

The Brazilian government does not yet have specific laws governing consumer rights online, but normally uses the Consumer Protection Code to decide disputes. It has made some minor changes in this code to cover online purchases though. For example, consumers can return items bought over the Internet if the goods are not what they originally ordered after a seven day cooling off period. As far as cross border e-commerce is concerned, Brazilian case law has served as the precedent in certain instances. One local court ruled that a multinational company that has a subsidiary in Brazil is responsible for product warranties even if its products were purchased overseas.[74]

Privacy and protection of data on the Internet covered

Specific Brazilian laws on the privacy and protection of data on the Internet have not been enacted yet either. However, the Federal Constitution of 1998 does contain general principles that govern these areas for data communications. These principles ensure the right to compensation for violations of privacy and declare that the confidentiality of correspondence and telegraphic, data, and telephonic communications are inviolable. A wide range of statutes, such as the Consumer Protection Code, General Telecommunications Law, Law 9507/97 ("Habeas Data" remedy provision), and the Law 4595 (which guarantees bank confidentiality), also serve to protect data privacy. Brazil's Consumer Protection Code, in particular, subjects to specific terms of imprisonment those persons: (1) who prevent or hinder consumer access to their own personal information contained in consumer data bases or records; and (2) who knowingly fail promptly to

[73] "Brazilian Law and Regulations", www.ebusinessforum.com, September 26, 2000; "Trademarks Versus Domain Names: Cybersquatting Violates Intellectual Property Rights", Observador Legal, November/December 2000, Noronha Advogados; and "Brazilian Domain Names: Issues and Disputes", Renata Neeser and Isabel Franco, www.demarest.com.br, Demarest & Almeida Advogados, January 18, 2002.

[74] "Brazilian Law and Regulations", www.ebusinessforum.com, September 26, 2000.

rectify any incorrect or imprecise data in consumer data bases or records. The Brazilian private sector has also taken action. The Polytechnic Engineering School of the University of Sao Paulo has partnered with several businesses to launch an Online Privacy Certificate Program open to Brazilian web sites committed to safeguarding their customers' personal data and privacy.[75]

Decision on the SPAM Issue sets precedent

ABRANET estimates that spam, unsolicited "junk" e-mail, causes a loss of $36 million each month in Brazil, based on the Internet user time required to download them. Most nations have tried to come up with rules that control the exponential growth of "spamming" and preserve the rights of users, but guarantee an environment of free expression on the Internet. Many have found that striking an ideal balance is a difficult task. In Brazil, the Superior Court of the State of Mato Grosso do Sul recently issued a precedent-making decision on this issue in a lawsuit against three Internet companies asking for indemnification for moral damages caused by the receipt of spam email. It ruled that ISPs were not liable for unsolicited messages sent to users by their commercial customers.[76]

Domestic online contracts covered by Brazilian Civil Law

Knowledgeable experts in Brazil believe that Brazilian Civil Code governs electronic contracts entered into by individuals or legal entities residing in Brazil. However, if one of the parties to an electronic contract is not domiciled in Brazil, such as in the case of the purchase of products or services from the titleholder of a site located abroad, the issue of which country's law applies has to be carefully considered. Generally, Brazilian civil law accepts that the law of the country where the obligations are constituted and the offeror resides governs the electronic contract. When there is a possible conflict of laws, the criterion determining the application of a certain law to a contract is the place where the obligation was constituted. The Brazilian government's definition of the constitution of a contract relates to whether it was made between absent and present parties. It defines contracts between "absent" parties not on the basis of distance of one person from another, but on the time that has lapsed between an offer and its acceptance. If acceptance happens immediately following the offer, the contract is regarded as being between present parties even though these individuals or legal entities are in different physical locations.

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[75] "Brazil: E-Commerce and Regulations", Julaina Viegas et al., Baker & McKenzie E-Law Alert, January 2001 and E-Commerce and Consumer Protection Legal Aspects, Ricardo Barretto Ferreira da Silva et al., paper prepared for the ALCA-Joint Government and Private Sector Experts Committee for Electronic Commerce, February 13-15, 2002.

[76] "Decision on Internet ISP Liability for Spamming", Juliana Viegas et al., Baker & McKenzie E-Law Alert, May 13, 2002 and E-Commerce and Consumer Protection Legal Aspects, Ricardo Barretto Ferreira da Silva et al., paper prepared for the ALCA-Joint Government and Private Sector Experts Committee for Electronic Commerce, February 13-15, 2002.

Formation of this kind of contract occurs on the date it is executed. On the other hand, if there is a significant period of time between offer and acceptance, then the contract is between absent parties. Formation and completion of this kind of contract occurs on the date the accepting party issues its acceptance.[77]

Progress made on the digital security issue

Much progress has occurred in providing security for electronic commerce transactions and documents. In September 2000, the Brazilian government issued Decree 3587 which laid the foundation for implementing rules for certifying and registering electronic documents, the establishment of the Brazilian Public Key Infrastructure (ICP-Brazil), and its use within federal agencies and departments. ICP-Brazil is a system that uses asymmetric cryptography (a combination of one public and one private mathematical key) to create a digital signature.[78] The Brazilian Congress then introduced Bill Number 1.589/99 in early 2001 which dealt more broadly with this issue. The legislation mandated what electronic contracts should contain (names, addresses, emails, etc.) and the use of the digital signature, electronic authentication, and public key certification. It also emphasized the need for protecting the confidentiality of information, determined the responsibilities of the parties involved in electronic contracts, and required that the Brazilian Consumer Protection Code be applied to them.[79]

Subsequent provisional laws and decrees set up the operations of the ICP-Brazil authority in November 2001 and regulated it by stipulating that federal agencies could only obtain digital certification from duly accredited and approved entities.[80] Other significant developments relating to digital certification followed. The Brazilian Ministry of Communications announced in January 2002 that the Postal Service was authorized, in association with 72 companies selected through public tender, to issue digital certificates for communications or business transactions conducted over the Internet. In early April, ICP-Brazil named the country's first digital certifiers: Serpro, a federal data processing agency, to act as the official certifier for Brazil's new real-time, interbank settlement system (SPB) and to provide digital certificates to companies doing business with the Brazilian government; and Serasa, a Brazilian financial analysis firm.[81]

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[77] E-Commerce and Consumer Protection Legal Aspects, Ricardo Barretto Ferreira da Silva et al., paper prepared for the ALCA-Joint Government and Private Sector Experts Committee for Electronic Commerce, February 13-15, 2002.

[78] "E-Commerce in Brazil and Latin America", International Market Insight, U.S. Department of Commerce, 2000

[79] "Brazil's Electronic Commerce Situation: The Validity of Electronic Contracts", Observador Legal, March/April 2001, Noronha Advogados.

[80] "The Brazilian Public Key Infrastructure to Start", Juliana Viegas et al., Baker & McKenzie E-Law Alert, November 5, 2001 and "New E-Commerce Regulations", Juliana Viegas et al., Baker & McKenzie E-Law Alert, November 12, 200.

[81] "Digital Certification", Juliana Viegas et al., Baker & McKenzie E-Law Alert, January 21, 2002; "B2B Digital Certification Gets a Boost with Serpro

The American Chamber of Commerce's Technology Rights Committee recently presented the Brazilian Minister of Justice with a draft bill of law, based on Bill of Law Number 84 and the Budapest Convention, that addresses computer crime. Among the actions to be considered as crimes are: gaining unauthorized access to computer systems; accessing computer programs and data banks without authorization; reading e-mails without authorization; and damaging computer programs, data banks, or access mechanisms.[82]

State and local taxes on ISPs reportedly restraining e-commerce

Brazilian Internet services providers and B2C suppliers have been greatly concerned about the adverse effect that state and local taxes may have on the growth of e-commerce in that country. As noted elsewhere in this study, purchasers of products are required to pay a value-added tax (ICMS) on what they buy while service firms are subject to a tax on the services (ISS) they render. The percentages that Brazilian states and localities charge on the value of products and services vary widely too. Individual Internet firms and the Brazilian Association of Internet Service Providers (ABRANET), their trade association, are concerned that some jurisdictions such as the State of Sao Paulo have been charging both the ICMS and the ISS taxes on Internet transactions on top of an already heavy corporate tax burden and claim that the wide range of levies have restrained B2C trade. They were actively working with state and local authorities in late 2001 to straighten out the confusion these taxes have engendered within the industry and to normalize or reduce them to zero throughout Brazil. ABRANET succeeded in October 2001 in obtaining a preliminary injunction to suspend the collection of the ISS tax levied on advertisement services provided over the Internet by ISPs in the city of Sao Paulo from 1996 to 2001. However, these firms will have to pay this municipal tax once again this year. In separate rulings, ISPs were exempted from paying the ICMS tax in the States of Minas Gerais and Parana by state courts that recognized them as value-added rather than telecommunications services providers. They will be subject instead to the ISS tax in both states.[83]

Regarding the issue of cross-border taxation of Internet transactions, the Brazilian government has been carefully considering what approach it will take in the future since it is concerned about the significant role that tax and tariff revenues have in its national budget and bilateral trade

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Authorization-Brazil", Business News Americas, April 2, 2002; and "More LatAm E-Commerce News-Regional", Business News Americas, April 11, 2002.

[82] "Draft Bill of Law Against Information Technology Crimes:, Juliana Viegas et al., Baker & McKenzie E-Law Alert, May 13, 2002.

[83] Interview with Murillo Marques Junior, President, the Brazilian Association of Internet Service Providers (ABRANET), September 20, 2001; "Value Added Tax on Internet Access", Juliana Viegas et al., Baker & McKenzie E-Law Alert, September 17, 2001: "ISPs Obtain Suspension of Municipal Tax on Services in Sao Paulo", Juliana Viegas et al., Baker & McKenzie E-Law Alert, October 15, 2001; and "State Value Added Tax", Juliana Viegas et al., Baker & McKenzie E-Law Alert, January 7, 2002.

concessions in other trade areas. It has reacted negatively in the past to proposals for an origin-based consumption tax on intangible Internet services. It realizes that Brazil, as a net importer of e-commerce, would lose badly needed revenues if such a tax were adopted since it would be collected from the supplier by a foreign taxing entity. The Brazilian government would presumably benefit more from a tax on the consumer, given the fact that these kinds of taxes are more important to Brazil's national fiscal health than income taxes.[84]

MARKET OPPORTUNITIES

As the largest and most dynamic IT market in Latin America, Brazil offers significant opportunities for U.S. suppliers of IT products and services. Brazilians have a high regard and strong preference for U.S. technologies and will buy from U.S. companies that have taken the trouble to localize their offerings and make them price competitive with those from domestic firms. Given the forecast for strong growth in the Brazilian economy over the next several years, Brazilian IT spending should increase at a healthy pace. The only factors that might adversely affect this rosy outlook would be another downturn in the global economy, a return of the energy crisis that this country endured in 2001, and further devaluation of the real.

Computer Equipment

Brazil's computer hardware market should be buoyed up by the private sector's ongoing modernization of its operations and the Brazilian government's commitment to providing Brazilians with e-government and expanding computer and Internet use throughout this country, especially in education and among the poor. These efforts should translate into sales opportunities for both U.S. IT companies, whether manufacturing equipment in Brazil or exporting out of the United States.

Brazilian businesses have an interest in purchasing a wide range systems over the next several years. They will need to upgrade their legacy computer systems to meet new demands. As they continue to build intranets and extranets and become more involved in e-commerce, they will have substantial demand for servers and desktop PCs. Corporate and SME executives, professionals of all types, university students, and sales and service personnel should also collectively represent a booming market for notebooks and handheld computers. The Brazilian government's broad Information Society Program targeting public sector agencies, schools, the health care sector, and the urban slums and rural communities, along with similar private sector and state government projects to help the poor, will boost sales of PCs and other types of Internet access devices as well. Since these efforts place a high priority on obtaining low cost systems, there may be a unique opportunity for used computer firms to sell their wares in Brazil.

[84] "Globalization and Electronic Commerce: Growth and Impacts in Brazil", Paulo Bastos Tigre, Center for Research on Information Technology and Organizations (CRITO), University of California, Irvine, June 2001.

The rising tide of computer systems purchases should benefit peripheral equipment suppliers. Best prospects include scanners, printers, disk drives, and digital video disk (DVD)players. Demand for high-end data storage devices should be particularly strong since corporate computer users have to manage and store the large volumes of data generated by the growth in e-business and have become increasingly concerned about data security and disaster recovery after receiving a severe jolt from the September 11th terrorist attacks on the United States.

Software

The Brazilian packaged software market has enormous potential for U.S. suppliers as along as the Brazilian government and private sector make meaningful progress toward reducing intellectual property rights violations. Brazilian manufacturing and services corporations have a significant need for software solutions that will help them reduce costs and increase profits through automation of their industrial and commercial processes. The software packages that will continue to be in the highest demand in Brazil are those for customer relationship management (CRM), supply chain management (SCM), networking and communications, database management, electronic document management (EDM), and enterprise resources planning (ERP). The most important vertical markets are agribusiness, education and training, financial services, healthcare, retail, telecommunications, and transportation.

Desktop PC applications, such as word processing, spreadsheet, and graphics, are good opportunities as the use of PCs grows among SMEs and more affluent home users. Educational software packages will emerge as another lucrative area in concert with the Brazilian government's efforts to provide PCs to secondary schools and its focus on electronic learning (e-learning).

As noted previously, most Brazilian companies are very concerned about the security of their operations following the terrorist attacks on the United States and are expected to spend heavily on IT security solutions such as encryption, anti-virus, and firewalls. The end-user sectors that U.S. firms might consider targeting first are financial services institutions, particularly banks, and retail operations since they face the most immediate security threats.

In systems and applications development (AD) software, Brazilians have shown a keen interest in both Linux and Java. Linux has become increasingly popular and made inroads into the strong hold Microsoft Windows has on the operating systems market for servers because it is an open source technology. As a result, many Brazilian businesses and public sector agencies are looking for suppliers who can develop solutions around Linux. Java tools have also gained a large following for applications development since this AD language allows users to develop software for a variety of different hardware platforms. The Gartner Group is extremely bullish about Java and predicts it will be adopted by more than 80 percent of mid-size to large Brazilian enterprises by 2005.

Networking Equipment

Brazil should be an excellent market for networking equipment, benefitting from the ongoing build-out of the telecommunications infrastructure and corporate interest in establishing intranets to make internal resources more available to employees and extranets to work more efficiently with suppliers, customers, and strategic partners. Greater PC and Internet use in education and healthcare should also lead to the spread of networking on university campuses, in schools, and among hospitals, clinics, and other medical facilities. Cahners In-Stat Group, a U.S. market research firm, believes Brazil is a "hot geography" for wireless local area networks (WLANs) along with Australia, New Zealand, and South Korea. Wireless Ethernet (Wi-Fi), which allows high-speed wireless connection to the Internet through base stations within buildings, has just been introduced into Brazil and is regarded as a promising technology, given the Brazilians' growing affinity for wireless communications.

IT Services

Spending on IT services in Brazil is projected to overtake investment in computer equipment by 2003 and increase very rapidly thereafter. A growing number of cost-conscious Brazilian businesses have been outsourcing their systems and network management and data processing activities to IT services providers and should continue to do. Public sector agencies and corporations engaged in a large number of ongoing modernization programs have a great need for IT consultants and systems integrators to install, program, and connect servers to legacy systems, to integrate front and back offices, and to provide education and training to alleviate Brazil's shortage of qualified IT personnel. The banking, health care, rail transportation, and retail industries are reportedly the leading vertical markets for these services. Finally, corporate executives have always considered data warehousing and IT security services an important part of their IT budgets, but should boost their investments in these areas substantially in the wake of the September 11th terrorist attacks on the United States. Concern about security is particularly high in Brazilian financial institutions, with up to 80 percent of all banks expected to use data warehousing in the near future.

Internet Services

Although the ISP market in Brazil has gone through a period of turmoil and consolidation in recent years, there are promising Internet services opportunities for U.S. suppliers. The expansion of e-commerce and e-government in this country will undoubtedly create significant demand for the services of companies that can design and develop web sites, provide content for them, and host them. Involvement in e-commerce may also stimulate many businesses to outsource all of their website and interconnection needs rather than taking on the burden of costly investments in telecommunications, network, and computing infrastructures and the in-house personnel required to run these operations.

Brazilian users will increasingly demand broadband Internet connections. SMEs will

follow large corporations in acquiring high-speed access as more of them become involved in e-commerce. Businesses in remote areas where a wired telecommunications infrastructure is not yet available will likely opt for satellite service. In the home user sector, high income residential customers will need broadband for more sophisticated applications such as streaming video, interactive entertainment, and distance learning. Wireless Internet access for business and home users through WAP and possibly other kinds of wireless services should grow substantially. Its use by companies will increase with the spread of mobile commerce in Brazil in the future. Wireless may be much more viable than wired access for home users, considering the low PC penetration and the popularity of cellular telephony there.

Selected Brazilian IT projects

Certain projects in a few economic sectors in Brazil are worth noting because of their potential for U.S. IT sales:

In transportation, INFRAERO, Brazil's state-owned airport infrastructure company, will invest to expand and modernize IT systems in airports up through 2004. Brazil's railroads also have efforts planned to improve their safety and boost their efficiency and competitiveness. The MRS Railroad, which operates in the southeastern states of Brazil, will implement a $20 million communications-based train control (CBTC) project through the use of an intranet and a global positioning satellite (GPS) over the next three to four years. The Ferroban Railroad in the State of Sao Paulo also plans to introduce new computerized control equipment throughout its 2,600 mile system.

The Brazilian government has several projects underway to modernize its healthcare system. The National Health Card program will automate medical care service in public hospitals and will provide all Brazilian citizens with electronic "smart cards" to store their medical records. The Department of Health has begun another initiative that will document information from health institutions in the Primary Health System and will eventually integrate 300 hospitals and 20,027 ambulatory units in 44 Brazilian municipalities. Specifically, the health care system needs hardware and software solutions to integrate hospitals and clinics, to automate pharmacies linked to hospitals, to monitor patients, to organize and store information on medical procedures, and to manage the finances and administrations of medical institutions. The advent of telemedicine in Brazil may also provide significant business opportunities for U.S. suppliers of computer and networking equipment, software, and broadband communications over the long term.

E-Commerce Applications

The focus of e-commerce in Brazil has been and will continue to be on B2B over the next several years. While the larger corporations are very advanced in their use of e-commerce applications, most Brazilian firms need to move beyond their use of the Internet largely for e-mail and information gathering to building Web sites to present their products and services and to undertaking transactions online. The more profitable of them are likely to establish intranets

and extranets, to engage in electronic procurement, and to integrate their logistics with suppliers as their businesses grow. Their involvement in these activities should significantly boost demand for Web design, development and hosting services, ERP, and SCM. When B2C finally takes off in other sectors outside of retail and automotive, Brazilian businesses will invest more heavily in CRM applications such as online order management, sales and marketing, and customer service and support. U.S. vendors should do well in the Brazilian market, given their strength in these areas.